

## ORAL ARGUMENT NOT YET SCHEDULED

**No. 22-7063**UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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AMERICAN SOCIETY FOR TESTING AND MATERIALS, et al.,  
Appellants

v.

PUBLIC.RESOURCE.ORG, INC.,  
Appellee

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Appeal from the United States District Court  
for the District of Columbia

Hon. Tanya S. Chutkan, No. 1:13-cv-1215-TSC

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**CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES**

Pursuant to Circuit Rule 28(a)(1), Appellants certify as follows:

**A. Parties and amici**

Appellants are American Society for Testing and Materials d/b/a/ ASTM International (“ASTM”), National Fire Protection Association, Inc. (“NFPA”), and American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (“ASHRAE”), which were the Plaintiffs/Counter-Defendants in the district court. Appellee is Public.Resource.Org, Inc., which was the Defendant/Counter-Plaintiff in the district court.

The following individuals/entities submitted amicus briefs to the district court:

- Ann Bartow
- American Insurance Association
- American Library Association
- American National Standards Institute, Incorporated
- American Property Casualty Insurance Association
- American Society of Safety Engineers
- Brian L. Frye
- David Ardia
- Elizabeth Townsend Gard

- Institute of Electrical and Electronics Engineers, Incorporated
- International Association of Plumbing & Mechanical Officials
- International Code Council, Inc.
- James Gibson
- Jessica Silbey
- Jennifer Urban
- Jonathan Zittrain
- Knowledge Ecology International
- National Electrical Manufacturers Association
- North American Energy Standards Board
- Pamela Samuelson
- Public Knowledge
- Rebecca Tushnet
- Reporters Committee for Freedom of the Press
- Sina Bahram
- Stacey Dogan
- Stacey M. Lantagne
- Underwriters Laboratories Inc.

**B. Rulings under review**

The rulings under review are (1) an Order, Dkt. 240 (Chutkan, J.), filed on March 31, 2022, by the U.S. District Court for the District of Columbia in No. 13-cv-1215, for which no reported citation exists; and (2) a Memorandum Opinion, Dkt. 239 (Chutkan, J.), and the Appendix thereto, Dkt. 239-1 (Chutkan, J.), filed on March 31, 2022, by the U.S. District Court for the District of Columbia in No. 13-cv-1215, available at 2022 WL 971735.

**C. Related cases**

This case was previously before this Court in No. 17-7035, *American Society for Testing, et al v. Public.Resource.Org, Inc.* Counsel are not aware of any other related cases before this Court.

## CORPORATE DISCLOSURE STATEMENT

Pursuant to Federal Rule of Appellate Procedure 26.1 and D.C. Circuit Rules 26.1 and 28(a)(1), Appellants respectfully submit the following corporate disclosure statements.

American Society for Testing and Materials (“ASTM”) hereby submits the following disclosure as a nongovernmental corporate party: ASTM is a not-for-profit corporation. It has no parent corporation and there is no publicly held corporation that owns 10% or more of its stock.

National Fire Protection Association, Inc. (“NFPA”) hereby submits the following disclosure as a nongovernmental corporate party: NFPA is a not-for-profit corporation. It has no parent corporation and there is no publicly held corporation that owns 10% or more of its stock.

American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (“ASHRAE”) hereby submits the following disclosure as a nongovernmental corporate party: ASHRAE is a not-for-profit corporation. It has no parent corporation and there is no publicly held corporation that owns 10% or more of its stock.

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## **GLOSSARY OF ABBREVIATIONS**

|               |  |
|---------------|--|
| ASHRAE        | American Society of Heating, Refrigerating, and Air Conditioning Engineers   |
| ASTM          | American Society for Testing and Materials   |
| IBR           | Incorporation by Reference   |
| NFPA          | National Fire Protection Association   |
| SMF           | Plaintiffs' Statement of Material Facts in Support of Their Motion for Summary Judgment                            |
| 2d. Supp. SMF | Plaintiffs' Second Supplemental Statement of Material Facts in Support of Their Second Motion for Summary Judgment |
| 3d. Supp. SMF | Plaintiffs' Third Supplemental Statement of Material Facts in Support of Their Second Motion for Summary Judgment  |

## STATEMENT OF JURISDICTION

The district court had jurisdiction under, *inter alia*, 28 U.S.C. §§ 1331 and 1338(a) because this case involves claims of copyright infringement in violation of 17 U.S.C. § 501. On March 31, 2022, the district court issued an order and opinion granting in part and denying in part Plaintiffs' motion for a permanent injunction. Plaintiffs filed a timely notice of appeal on April 28, 2022. This Court has jurisdiction under 28 U.S.C. § 1292(a)(1) because the district court denied in part Plaintiffs' motion for injunctive relief.

## STATEMENT OF ISSUES

1. Whether the district court erred in holding that Defendant Public.Resource.Org's indiscriminate copying of Plaintiffs' copyrighted works constituted a fair use under 17 U.S.C. § 107—a ruling that applied to 185 of the 217 copyrighted works (the “Works”) at issue in Plaintiffs' motion for summary judgment.

2. Whether the district court erred in refusing to enter a permanent injunction after finding that Public.Resource.Org infringed 32 of the copyrighted works at issue.

## STATUTES AND REGULATIONS

Pertinent statutory and regulatory provisions are reproduced in the Addendum to this brief.

## INTRODUCTION

This case concerns Public.Resource.Org’s copying and distribution of hundreds of Plaintiffs’ copyrighted standards, many of which have been incorporated by reference (“IBR’d”) into statute or regulation. Public.Resource.Org tries to justify its mass infringement arguing that these privately authored standards are “the law.” Declining to adopt that sweeping argument, this Court remanded this case with instructions to “weigh the [statutory fair use] factors as applied to [Public.Resource.Org]’s use of *each standard*” in issue. *Am. Soc’y for Testing & Materials v. Public.Resource.Org, Inc.*, 896 F.3d 437, 449 (D.C. Cir. 2018) (ASTM II) (emphasis added). Under that directive, the district court should have determined whether “the *relevant portions* of... particular standard[s]” that Public.Resource.Org copied and distributed were “essential to comprehending one’s legal duties” (factor one), and whether Public.Resource.Org’s actions created an “adverse impact on the market for the copyrighted works [Public.Resource.Org] reproduced” (factor four). *Id.* at 450, 452-53 (emphasis added).

The district court failed to follow this Court’s direction. The district court ignored Plaintiffs’ uncontested evidence establishing that Public.Resource.Org copied and distributed substantial portions of Plaintiffs’ works that are neither “legally binding” nor “essential to comprehending one’s legal duties.” *Id.* at 447, 450. This material included, for example, background information regarding the

standards' histories and material that expressly stated that it did *not* impose any requirement or obligation. On market harm, the district court committed legal error by placing on Plaintiffs the burden of negating the existence of such harm, when Public.Resource.Org has the burden of proving each factor of its fair use affirmative defense. The court compounded this error by failing to account for Plaintiffs' unrebutted evidence that unrestricted use of the type Public.Resource.Org made of Plaintiffs' works would destroy the market for Plaintiffs' works, and therefore concluding this factor favored Public.Resource.Org. Even for the couple dozen standards where the district court did not find fair use, it erred, denying the injunction Plaintiffs sought even where the court found they had met, at least in part, all four injunctive-relief factors.

The result of these and other errors is a decision that threatens a public-private partnership that has made invaluable contributions to public safety and the country's economic well-being for over a century. Plaintiffs and other self-funded, non-profit standards development organizations are able to create, maintain, and disseminate their works—including making those works available online for free viewing—only because copyright protects those organizations' right to receive remuneration from the businesses and industry professionals who consume copies and downloads of those works in furtherance of their profit-making enterprises. Plaintiffs make the standards in issue available for free public viewing by anyone who wants to know

what they say. Public.Resource.Org’s indiscriminate mass copying and distribution of Plaintiffs’ works allows the same market participants who otherwise would pay for Plaintiffs’ works to, instead, freely copy and further disseminate those works, including substantial portions that are not essential for anyone to comprehend any legal duties.

This Court specifically noted that the fair use defense was supposed to “allow[] copying only where it serves a public end rather than permitting competitors to merely sell duplicates at a lower cost.” *ASTM II*, 896 F.3d at 447. But in allowing Public.Resource.Org’s mass infringement, the district court’s decision invites exactly the result this Court sought to avoid. Already, a venture-capital-backed startup that directly competes with standards development organizations is arguing that fair use permits its wholesale copying and distribution of huge swaths of copyrighted standards that are IBR’d (including standards of Plaintiffs NFPA and ASHRAE), regardless of whether the copied portions may be said to impose any legal duties. *See Nat’l Fire Prot. Ass’n, Inc. v. UpCodes, Inc.*, 2021 WL 4913276 (C.D. Cal. Aug. 9, 2021); *Int’l Code Council, Inc. v. UpCodes, Inc.*, 2020 WL 2750636 (S.D.N.Y. May 27, 2020).

The district court’s decision on fair use should be vacated and remanded for proper application of this Court’s fair use test, focusing on whether Public.Resource.Org has posted only material “essential” to complying with the law.

And, given Plaintiffs' clear entitlement to a permanent injunction as to certain standards, the Court should also reverse the district court's denial of that injunction.

## STATEMENT OF THE CASE

### I. Background

#### A. Plaintiffs' creation of voluntary consensus standards depends on robust copyright protection.

Plaintiffs—private non-profits—are standards development organizations whose public-service missions include promoting public health and safety and encouraging environmental sustainability. JA\_\_\_\_, \_\_\_, \_\_\_ (SMF ¶¶9, 86, 129). The standards at issue include product specifications, methods for manufacturing and testing materials, and recommended practices to ensure safety and efficiency. *See ASTM II*, 896 F.3d at 441. Plaintiffs create their standards through a voluntary consensus process. *Am. Soc'y for Testing & Materials v. Public.Resource.org, Inc.*, 2017 WL 473822, at \*2 (D.D.C. Feb. 2, 2017) (*ASTM I*). That consensus process ensures that standards reflect balanced input and expertise of a wide range of interested parties, including consumer groups, industry representatives, academics, technical experts, and representatives from government. *See id.*; *ASTM II*, 896 F.3d at 441.

It requires a substantial investment—millions a year—to create voluntary consensus standards. JA\_\_\_\_, \_\_\_, \_\_\_ (SMF ¶¶44, 105, 152). Those expenses arise from work including convening technical committee meetings, collecting research

and data, employing technical experts, and gathering public input. JA\_\_\_\_, \_\_\_, \_\_\_ (SMF ¶¶43, 104, 152).

Plaintiffs recoup those substantial costs, and support their overall mission-driven activities, the same way copyright owners generally do: by selling and licensing copies of their copyrighted standards. JA\_\_\_\_-\_\_\_\_, \_\_\_, \_\_\_-\_\_\_\_, \_\_\_ (SMF ¶¶43-47, 104-08, 152-56, 251-52). The companies and individuals who buy Plaintiffs' standards are typically people in the affected industries who use standards in their professional trade. *See ASTM I*, 2017 WL 473822, at \*4, 10-11; JA\_\_\_\_, \_\_\_, \_\_\_-\_\_\_\_ (SMF ¶¶45-47, 106-08, 153-54). Plaintiffs generate the majority of their revenues (sometimes two-thirds or more) from selling copies of their standards. JA\_\_\_\_, \_\_\_, \_\_\_ (SMF ¶¶47, 106, 153). Threatening Plaintiffs' ability to enforce their copyright jeopardizes their ability to continue their current standards-development work. JA\_\_\_\_-\_\_\_\_, \_\_\_, \_\_\_ (Jarosz Report ¶¶6, 153, 163).

**B. Incorporation by reference is a longstanding public-private partnership that protects copyright.**

Governments have long recognized the value of voluntary consensus standards. At the federal level, Congress mandated in the National Technology Transfer and Advancement Act of 1995 that agencies “use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards... to carry out policy objectives or activities.” Pub. L. No. 104-

113, § 12(d)(1), 110 Stat. 775, 783 (1996). Some states have similar requirements.

*See, e.g.*, Cal. Health and Safety Code § 18910 *et seq.*

Governments are cognizant of the copyrights held by Plaintiffs and others and the importance of that protection to the overall public-private partnership. They have accordingly relied on those standards in their statutes and regulations through a process of IBR. Under this approach, rather than creating a new set of rules out of whole cloth, a government entity—for example, a federal agency or a state legislature—references the applicable standard as extrinsic material when drafting its statute or regulation. *See* 5 U.S.C. § 552(a)(1); 1 C.F.R. § 51.1 *et seq.* IBR serves an intentional balance: it saves governments (and, in turn, taxpayers) the cost and administrative burden of creating and updating their own standards, and also protects the copyrights of standards development organizations. *See* Office of Management and Budget Circular A-119, 63 Fed. Reg. 8546 (Feb. 19, 1998), *as revised* 81 Fed. Reg. 4673 (Jan. 27, 2016), *available at* 2016 WL 7664625, at \*13, 19-20. Because standards reflect best practices and accordingly often already dictate industry norms, the IBR process decreases “the burden of complying with agency regulation.” *Id.* at 13. Further, IBR “provid[es] incentives” for private standards development organizations to create “standards that serve national needs... promoting efficiency, economic competition, and trade.” *Id.*

Given the tremendous public benefits that flow from reliance on private standards, the IBR process is incredibly widespread. The Code of Federal Regulations has over 23,000 sections incorporating private standards. Emily S. Bremer, *Technical Standards Meet Administrative Law: A Teaching Guide on Incorporation by Reference*, 71 Admin. L. Rev. 315, 316-17 (2019). All 50 states and numerous localities also employ the practice. For example, NFPA standards have been IBR'd, either directly or indirectly, in over 16,000 state and local statutes and regulations.

Because copyright protection is necessary for Plaintiffs to continue developing standards, that copyright protection is, in turn, necessary for governments to be able to rely on those standards. If Plaintiffs cannot fund their work through copyright, governments cannot use those standards in their statutes and regulations. As the Office of the Federal Register put it, making IBR'd standards free “would compromise the ability of regulators to rely on voluntary consensus standards, possibly requiring them to create their own standards, which is contrary to the [National Technology Transfer and Advancement Act of 1995] and the [Office of Management and Budget] Circular A-119.” 79 Fed. Reg. 66,267, 66,268 (Nov. 7, 2014).

**C. Plaintiffs make their IBR'd standards widely available to the public, including through free online access.**

Consistent with Plaintiffs' non-profit status and public-service missions, Plaintiffs make their IBR'd standards available to the public through multiple channels. Most notably, Plaintiffs make all their IBR'd standards available for free read-only access on their websites. JA \_\_\_\_ (2d. Supp. SMF ¶85); *see also infra* note 10.<sup>1</sup> That format allows anyone to read the text of a standard but prevents downloading and printing copies that would substitute for Plaintiffs' paid offerings. *See* pp. 43-45, *infra*. Thus, this format permits Plaintiffs to further their public-interest missions, while preventing unauthorized distribution that would supplant Plaintiffs' sales of standards to the industry professionals who rely on those standards in their work. JA \_\_\_\_ - \_\_\_\_ (2d. Supp. SMF ¶¶85, 88-89).

Given Plaintiffs' efforts to ensure public access to their standards, it is unsurprising that there is no evidence in the record that anyone has ever been unable to access one of the standards at issue in this litigation to comply with a government regulation. To the contrary, the undisputed evidence shows that people who rely on

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<sup>1</sup> Plaintiffs also sell hard and digital copies of their standards, principally to industry professionals, at reasonable prices. JA \_\_\_, \_\_\_, \_\_\_ (SMF ¶¶58, 99, 158) (prices generally ranged from \$25 to \$120, with no standard more than \$200). Some standards are also available as part of a membership or subscription. JA \_\_\_\_ (2d. Supp. SMF ¶78).

standards can obtain them with little difficulty. JA\_\_\_\_, \_\_\_\_ (SMF ¶¶89, 275); JA\_\_\_\_ (Thomas Decl. ¶¶44-54); JA\_\_\_\_-\_\_\_\_ (Reinicke Decl. ¶¶18-20).

## II. Procedural History

### A. *ASTM I*

Public.Resource.Org is a non-profit with the stated mission of “mak[ing] the law and other government materials more widely available.” *ASTM I*, 2017 WL 473822, at \*2 (citation omitted). Public.Resource.Org does not claim that it needs access to any of Plaintiffs’ standards to comply with government regulations. Instead, it seeks the right to post copies of Plaintiffs’ standards on its website so that others can copy, print, distribute, or make derivative works of Plaintiffs’ standards for free.

Starting in December 2012, Public.Resource.Org began posting copies of Plaintiffs’ standards that it claimed (erroneously, in some instances, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶36)) had been IBR’d on its website and on the Internet Archive. JA\_\_\_\_ (SMF ¶186). Any user can download, copy, or print Public.Resource.Org’s versions of Plaintiffs’ standards for free, without any restrictions on use or further dissemination of the standards. *ASTM I*, 2017 WL 473822, at \*23; JA\_\_\_\_, \_\_\_\_ (SMF ¶¶185, 202, 204). Plaintiffs’ standards have been downloaded tens of thousands of times from the Public.Resource.Org and Internet Archive sites. JA\_\_\_\_ (SMF ¶¶241-42); JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶98, 102). And, while Public.Resource.Org posted

those standards bearing Plaintiffs' names and logos, Public.Resource.Org's copying process introduced errors into the reproduced works. JA \_\_\_\_-\_\_\_\_, \_\_\_\_ (SMF ¶¶182, 185, 188-91, 195, 214-216). The net result is that Public.Resource.Org reproduces and displays wholesale, inferior copies of Plaintiffs' standards with the purported aim of making IBR'd standards freely accessible—even though Plaintiffs already provide free access to all IBR'd standards.

In 2013, Plaintiffs filed suit for copyright infringement to enjoin Public.Resource.Org's mass copying and distribution of their standards. Rejecting Public.Resource.Org's arguments across the board, the district court granted summary judgment and permanent injunctive relief to Plaintiffs. *ASTM I*, 2017 WL 473822, at \*25.

#### **B. *ASTM II***

On appeal, this Court understood both Plaintiffs and Public.Resource.Org to be seeking “a bright-line rule either prohibiting (the [Plaintiffs]) or permitting ([Public.Resource.Org]) *all* of [Public.Resource.Org]’s uses of *every* standard incorporated by reference into law.” *ASTM II*, 896 F.3d at 446. This Court declined to adopt such a rule. Instead, it remanded for further factual development regarding Public.Resource.Org’s argument that its use of Plaintiffs’ standards was a fair use on the theory that Public.Resource.Org was merely posting material “essential to understanding one’s legal obligations.” *Id.* at 453. The Court emphasized that the

fair use analysis would need to take account of the significant variation among standards and the way standards are IBR'd. *See, e.g., id.* at 443, 447. And it directed the district court to assess whether Public.Resource.Org had justified its fair use defense as to each portion of the standards it posted. *Id.* at 450. As this case involves about 200 standards, the Court suggested considering "whether the standards are susceptible to groupings that are relevant to the fair use analysis." *Id.* at 449.

### C. *ASTM III*

On remand, the parties cross-moved for summary judgment as to 217 of Plaintiffs' standards. Following this Court's direction, Plaintiffs engaged in a detailed analysis of each standard, explaining why Public.Resource.Org's fair use defense failed for (at least) portions of each standard, and offering various groupings "relevant to the fair use analysis," *ASTM II*, 896 F.3d at 449. JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶36-76). Disregarding this Court's effort to avoid a "bright-line" resolution of the case, *ASTM II*, 896 F.3d at 446, Public.Resource.Org, by contrast, insisted that any standard that has been IBR'd in any way and to any extent could be freely posted in its entirety. *See* Public.Resource.Org Second Motion for Summary Judgment 21-30, Dkt. 202; JA\_\_\_\_ (2d. Supp. SMF ¶¶31-32) (Public.Resource.Org disavowing obligation to conduct fine-grained analysis of standards' legal effect, claiming that "entirety of each standard" is IBR'd and Public.Resource.Org "is not an attorney" and could not provide legal advice). Public.Resource.Org largely did not respond to

Plaintiffs' arguments about why particular standards or particular portions thereof were not essential to complying with any legal duty.

The district court granted in part and denied in part both motions. The court first ruled that Plaintiffs own valid copyrights in each standard. JA\_\_\_\_ (Memorandum Opinion 16-21). In the process, the court rejected Public.Resource.Org's argument—based on an erroneous reading of *Georgia v. Public.Resource.Org, Inc.*, 140 S. Ct. 1498 (2020)—that Plaintiffs' standards become uncopyrightable “government edicts” once IBR’d. See Public.Resource.Org Supplemental Brief 3-4, Dkt. 226. The district court correctly found that Public.Resource.Org did “not offer any evidence that a judge or legislator wrote any of Plaintiffs’ standards” or that “state legislators hired Plaintiffs to draft the standards.” JA\_\_\_\_ (Memorandum Opinion 20). As such, the court concluded that “[a] government body that merely incorporates a standard by reference does not independently create any content, and therefore does not become an ‘author’ of the standard.” JA\_\_\_\_ (Memorandum Opinion 20); *accord Georgia*, 140 S. Ct. at 1507 (holding the government edicts doctrine “does not apply... to works created by... private parties... who lack the authority to make or interpret the law”).

Turning to fair use, the district court rejected Public.Resource.Org's fair use defense as to 32 standards that Public.Resource.Org had not shown were even IBR’d, but found fair use for 185 standards (the “Works”) where

Public.Resource.Org had identified some past or current incorporating statute or regulation. The district court acknowledged that this Court had directed an analysis that “consider[ed] the variations and legal status of each of the standards.” JA\_\_\_\_ (Memorandum Opinion 7). And it issued a lengthy appendix that addressed each of the four fair use factors for each of the standards. JA\_\_\_\_ (District Court Appendix). For the most part, though, the district court offered the same conclusory reasoning as to each fair use factor for each Work. And, with a few exceptions, it examined standards in their entirety, ignoring Plaintiffs’ arguments about (and this Court’s direction to consider) portions of Works that Public.Resource.Org copied that did not impose any legal obligations.

Despite finding infringement, the court denied a permanent injunction as to the 32 standards where it concluded Public.Resource.Org’s fair use defense failed. JA\_\_\_\_ (Memorandum Opinion 47). Plaintiffs appealed.<sup>2</sup>

## **SUMMARY OF ARGUMENT**

I. Because this case implicates substantial policy considerations, this Court rejected any “bright-line rule,” including one that would permit “*all* of

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<sup>2</sup> Public.Resource.Org did not cross-appeal. It is accordingly barred from presenting any argument that would “enlarg[e] [its] own rights” or “lessen[] [Plaintiffs’] rights” under the district court’s judgment, *Jennings v. Stephens*, 574 U.S. 271, 276 (2015) (citation omitted)—*e.g.*, any argument that would require setting aside the district court’s ruling that Public.Resource.Org had infringed 32 of Plaintiffs’ copyrights.

[Public.Resource.Org]’s uses of every standard incorporated by reference into law.” *ASTM II*, 896 F.3d at 446. This Court instead remanded for a “narrower” fair-use analysis, which the Court recognized would need to consider that standards “vary considerably in form, substance, and effect.” *Id.* at 443, 447.<sup>3</sup>

Fair use is an affirmative defense so, on remand, Public.Resource.Org was required to justify its copying as to each portion of (or the entirety of) each standard that it posted. *See, e.g., id.* at 450, 452. It did not. Plaintiffs, by contrast, did that work and identified the copyrighted material that Public.Resource.Org posted for which, under this Court’s prior analysis, verbatim copying was unjustified (including by grouping standards into categories based on type of non-essential material). The district court all but ignored Plaintiffs’ analysis. While issuing a lengthy appendix, the district court largely copied and pasted the same conclusory reasoning as to each factor for each of the 185 Works—and did not consider that large portions of each Work were not essential to understanding legal duties.

Public.Resource.Org also had the burden to establish that its unauthorized use would not harm the market for Plaintiffs’ Works. The district court committed legal error—and parted ways with two courts of appeals—by improperly shifting to

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<sup>3</sup> Plaintiffs recognize *ASTM II* is binding but respectfully preserve their arguments that the decision’s interpretation of the fair use factors as applied to IBR’d standards was in error.

Plaintiffs the burden on factor four, tainting the court's entire analysis of market harm. The undisputed evidence on this factor favors Plaintiffs.

The upshot was that the district court adopted the bright-line rule this Court rejected: without exception, when the court found a standard had been IBR'd, it found fair use. This Court should remand for the analysis it required.

II. The district court also erred in failing to grant a permanent injunction after finding that Public.Resource.Org infringed the copyrights of 32 standards. Plaintiffs showed that each of the four injunctive-relief factors favored entering such relief and that they are not adequately protected absent an injunction. The Court should reverse that ruling.

## **STANDARD OF REVIEW**

This Court reviews a decision on summary judgment de novo, "viewing the evidence in the light most favorable to [the non-moving party], and drawing all reasonable inferences in [its] favor." *Stoe v. Barr*, 960 F.3d 627, 629 (D.C. Cir. 2020); *Capitol Sprinkler Inspection, Inc. v. Guest Servs., Inc.*, 630 F.3d 217, 223 (D.C. Cir. 2011). The Court reviews the district court's balancing of injunctive-relief factors for an abuse of discretion, "review[ing] any underlying legal conclusions de novo." *Doe v. Mattis*, 889 F.3d 745, 751 (D.C. Cir. 2018).

## ARGUMENT

### I. The District Court Erred In Analyzing Fair Use.

Public.Resource.Org did not meet its burden of demonstrating fair use as to the Works, and it was not entitled to summary judgment. Plaintiffs recognize that, under *ASTM II*, fair use permits *some* use of their standards, but Public.Resource.Org's use is not fair. It involves wholesale, indiscriminate copying of the entirety of Plaintiffs' standards. At a minimum, disputed factual questions regarding the extent to which vast portions of each of the Works impose any binding obligation and the impact on the market preclude summary judgment. This Court should vacate and remand for the district court to apply the four fair use factors as this Court directed. In particular, the Court should direct the district court to do the following on remand:

- Address whether the incorporating regulation makes the entire Work or only some portion thereof “essential to understanding one’s legal obligations,” *ASTM II*, 896 F.3d at 453;
- Address whether the Work includes portions that are not “essential” but merely “help[ful]” to understanding the Work, *id.* at 450;
- Address whether Plaintiffs and Public.Resource.Org have overlapping purposes and, if so, whether Public.Resource.Org’s use can nonetheless be considered transformative;
- Analyze the record evidence regarding market harm with the burden of proof properly allocated to Public.Resource.Org; and
- Explain its conclusions regarding each factor either for each Work or for representative Works (e.g., why a Work is or is not a reference

procedure) and how those conclusions weigh into its bottom-line holding regarding fair use.

**A. Factor 1: Public.Resource.Org’s wholesale distribution of Plaintiffs’ Works is not transformed by purportedly making “the law” available to the public.**

The first fair use factor requires courts to consider “the purpose and character of the use.” 17 U.S.C. § 107(1).<sup>4</sup> In its prior opinion, this Court directed the district court to consider “whether, in certain circumstances, distributing copies of *the law* for purposes of facilitating public access could constitute transformative use.” *ASTM II*, 896 F.3d at 450 (emphasis added). The Court made clear that “the law” for these purposes was not co-extensive with all IBR’d material and that the fairness of “[Public.Resource.Org]’s specific use” must be assessed for each portion of a standard. *See id.* at 450-51. The summary judgment record demonstrates conclusively that Public.Resource.Org’s wholesale copying and public distribution of Plaintiffs’ standards is not transformative for two independent reasons. First, Public.Resource.Org does not limit its copying and distribution to “relevant portions of... particular standard[s]” that could be called “the law” under any approach, instead indiscriminately posting text that is “not essential to complying with any

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<sup>4</sup> This Term, the Supreme Court will hear *Andy Warhol Foundation for the Visual Arts, Inc. v. Goldsmith*, No. 21-869, which raises an issue regarding what constitutes a transformative use. Given the importance of transformativeness to this appeal, this Court may wish to consider ordering supplemental briefing once that decision is issued.

legal duty.” *Id.* Second, Plaintiffs already make the Works freely accessible to the public and Public.Resource.Org’s copies serve the same purpose.<sup>5</sup>

1. *Public.Resource.Org does not limit its copying to portions of Works that are essential to comprehending legal duties.*

Public.Resource.Org’s threat to Plaintiffs is so dire because it copies and distributes the Works wholesale—*i.e.*, far more than what is essential to complying with the law. In *ASTM II*, the Court distinguished between specific portions of standards that are “*essential* to comprehending one’s legal duties” (which could tilt toward a transformative use as to those portions), and those portions that just “*help inform* one’s understanding of the law” (which would cut against transformation for those portions). *ASTM II*, 896 F.3d at 450 (emphasis added). It emphasized that this inquiry would require assessing the legal significance of particular portions of standards, and the particular way in which each standard was incorporated. *See id.* at 450-51. The record demonstrates that Public.Resource.Org has posted significant portions of material from each Work that are not essential to comprehending legal duties and that Plaintiffs are entitled to summary judgment that Public.Resource.Org’s copying of these sections is not transformative. At the least,

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<sup>5</sup> Although this Court previously concluded that Public.Resource.Org’s use was not commercial, it made clear that this was merely one “facet” of the first fair use factor and ““does not insulate [Public.Resource.Org] from a finding of infringement.”” *ASTM II*, 896 F.3d at 449 (quoting *Campbell v. Acuff-Rose Music, Inc.*, 510 U.S. 569, 584 (1994)).

there are factual questions about whether those portions are necessary to comply with the law such that Public.Resource.Org did not meet its burden of demonstrating transformative use.

- a. *Plaintiffs introduced substantial evidence showing that whole Works and portions thereof were not essential to complying with the law.*

Following this Court's direction, Plaintiffs exhaustively detailed the many reasons that Public.Resource.Org's postings do not consist of only portions of Works that are critical to complying with the law.

Works where only portions are relevant to incorporation: When only specific portions of incorporated standards are relevant to an incorporating regulation, posting the irrelevant portions cannot be transformative. *See ASTM II*, 896 F.3d at 450 (explaining that posting “the relevant portions” of a standard could be considered transformative); *see also id.* at 452. Yet for every Work, Public.Resource.Org posted the standard in its entirety even though, for numerous Works, only a portion was relevant to the incorporating regulation. *See, e.g.*, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶48); JA\_\_\_\_-\_\_\_\_ (3d. Supp. SMF ¶8).

For example, Public.Resource.Org relied on 46 C.F.R. § 56.60-2 (1997) as the basis for posting ASTM B85 (1984). JA\_\_\_\_-\_\_\_\_ (District Court Appendix ¶71). That regulation provides that “[m]inimum values” for certain tension tests “shall be those listed in table X-2 of ASTM B85.” 46 C.F.R. § 56.60-2, n.14 (1997). The

parts of ASTM B85 outside of table X-2 are unnecessary to determine the minimum values in X-2. JA\_\_\_\_ (2d. Supp. SMF ¶48(b)). Nonetheless, Public.Resource.Org posted the entirety of ASTM B85.

Similarly, Public.Resource.Org sought to justify its posting of the full text of NFPA 11 (2005) based on a regulation that provides that “[f]ixed extinguishing systems” must comply with the standard. JA\_\_\_\_-\_\_\_\_ (District Court Appendix ¶8). The standard, however, includes provisions related to not just fixed, but also semifixed and portable systems. The standard’s provisions related to semifixed and portable systems are *not* necessary to complying with the regulation Public.Resource.Org identified. *See* JA\_\_\_\_-\_\_\_\_ (3d. Supp. SMF ¶8).

And, by the same token, the regulation that Public.Resource.Org identified requiring veterans cemeteries to meet the architectural and structural requirements of NFPA 101 (2003), JA\_\_\_\_ (District Court Appendix ¶25 (citing 38 C.F.R. § 39.63 (2011))), does not require compliance with, for example, NFPA 101’s provisions related to one- and two-family dwellings, day-care occupancies, and educational occupancies. JA\_\_\_\_-\_\_\_\_ (3d. Supp. SMF ¶8).

Works incorporated as reference procedures: This Court explained that Public.Resource.Org likely could not show a transformative use for a standard that was incorporated “as a reference procedure”—*i.e.*, in instances where the regulation

explains that complying with the standard would “satisf[y] the codified requirements.” *ASTM II*, 896 F.3d at 443, 450.

Yet many of the Works were incorporated as reference procedures. *See, e.g.*, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶46-47). For example, Public.Resource.Org relied on 40 C.F.R. Appendix D to Part 75 (2010) as the regulation incorporating ASTM D1217 1993 (1998). *See* JA\_\_\_\_ (District Court Appendix ¶76). As Plaintiffs explained, that regulation expressly provides an “*Optional* SO<sub>2</sub> Emissions Data Protocol for Gas-Fired and Oil-Fired Units” that “*may be used* in lieu of” alternative options. 40 C.F.R. Pt. 75, App. D (2010) (emphasis added). The subsection referencing D1217 provides a list of options for “[d]etermin[ing] the density or specific gravity of the oil sample,” including D1217, other incorporated standards, or “any consensus standard method prescribed for the affected unit under part 60 of this chapter.” *Id.* § 2.2.6. D1217 is thus an option, provided as a reference point, but it is not itself “essential to complying with any legal *duty*.” *ASTM II*, 896 F.3d at 450 (emphasis added).

Non-mandatory portions of Works: Plaintiffs’ standards are designed to be comprehensive documents describing the authoring Plaintiff’s view of best practices for performing work in a particular field or context, not statute books containing a list of mandatory rules. For that reason, each of the Works contains significant optional or explanatory material—*i.e.*, information that, when IBR’d, would, at

most, be “help[ful]” for following that regulation, but would not be “essential” for doing so. *ASTM II*, 896 F.3d at 450. That material includes informational appendices and annexes that are expressly non-mandatory, JA\_\_\_\_-\_\_\_\_, \_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶51(a), 52, 67, 72-74); prefatory and background material regarding, for example, the history and development of standards, JA\_\_\_\_-\_\_\_\_, \_\_\_\_ (2d. Supp. SMF ¶¶62-63, 71); reference and informational notes that state that they are “informational only” and “not enforceable as requirements” of the standard, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶64); diagrams, figures, illustrations, and examples that illustrate concepts for guidance but do not impose any requirements themselves, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶65-66); statements regarding the developing organization’s policy positions, JA\_\_\_\_ (2d. Supp. SMF ¶76); provisions that “describe options or alternative methods,” but are not “required” portions of the standards, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶57-60); and sections identifying the “location of selected changes” from previous editions, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶51(b), 53). None of that information could possibly be considered *essential* to complying with the law, but Public.Resource.Org copied it all anyway.

Works that are not IBR’d by in-force regulations: Plaintiffs identified dozens of instances where Public.Resource.Org identified only an outdated regulation incorporating the Works. *See, e.g.*, JA\_\_\_\_ (3d. Supp. SMF ¶5). For example, Public.Resource.Org pointed to 40 C.F.R. § 1065.1010 (2008) as the regulation that

IBR'd ASTM D2163-91 (1996).<sup>6</sup> JA\_\_\_\_ (District Court Appendix ¶91). That regulation was amended in 2008 and it no longer incorporates that version of that standard. JA\_\_\_\_ (Wise Decl., Ex. 176, at 61); *see also* 73 Fed. Reg. 25,098, 25,349 (May 6, 2008) (IBR'ing ASTM D2163-05); 40 C.F.R. § 1065.1010 (2021) (IBR'ing ASTM D2163-07). Whatever the significance of D2163-91 (1996) prior to 2008, that version can no longer be said to have a “direct legal effect on any private party’s conduct.” *ASTM II*, 896 F.3d at 443.

b. *The district court’s truncated review of the Works did not follow this Court’s direction.*

The district court largely ignored Plaintiffs’ detailed analysis. For 132 of the 185 Works, the court stated only that “the incorporated standard provides information essential for a private entity to comprehend its legal duties,” supporting fair use. Brief Appendix §§ B.1-B.2 (132 Works).<sup>7</sup> For nearly all the other Works, the court concluded that the standard did “not provide information essential for a private entity to comprehend its legal duties” because it was incorporated as a

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<sup>6</sup> For ASTM standards, numbers after a dash indicate the original adoption or revision year and a year in parentheses denotes a reapproval without changes in that year. JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶35).

<sup>7</sup> As to *one* of these 132 Works, the court limited its conclusion about “essential” information to the standard’s Test Methods A and B. JA\_\_\_\_ (District Court Appendix ¶1).

For the Court’s convenience, Plaintiffs have prepared a summary appendix quoting the district court’s different treatments of each fair use factor and identifying each standard to which the district court applied that treatment. *See* Brief Appendix.

reference or discretionary procedure. Brief Appendix § B.3 (48 Works). Here, too, the court provided almost no additional explanation for its conclusion.<sup>8</sup> For the remaining Works, the court found two were incorporated as discretionary procedures but nonetheless were essential to complying with the law; and three were not essential to any private entity's compliance with the law but helped "facilitate[] public debate." Brief Appendix §§ B.4-B.5 (5 Works).

This is not what *ASTM II* directed the district court to do. And, by addressing the Works this way, the court failed to provide any meaningful basis for appellate review. *See OSI, Inc. v. United States*, 285 F.3d 947, 953 (11th Cir. 2002) (vacating summary judgment: "[o]ur review would be greatly facilitated by a comprehensive analysis by the district court of the relevant facts as to which there is no genuine dispute and by a comprehensive analysis of the legal issues"); *Klein v. Perry*, 216 F.3d 571, 575 (7th Cir. 2000) (vacating summary judgment: "district court was not as thorough as it should have been" and provided "unsupported conclusion [that] is insufficient to permit this court to engage in meaningful review"). More particularly,

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<sup>8</sup> For six Works, the court provided some (often minimal) standard-specific statement. *See, e.g.*, JA\_\_\_\_ (District Court Appendix ¶7) (standard "is incorporated as a reference procedure *for a public Department*" (emphasis added)); *see also* JA\_\_\_\_ - \_\_, \_\_ - \_\_, \_\_ - \_\_ (District Court Appendix ¶¶11, 57, 59, 150-51). But for the remaining 42 Works, the court's conclusion was a summary sentence stating the standard was "incorporated as a discretionary procedure" or "as a reference procedure"—either of which weighed *against* fair use.

the court’s evaluation of the essential-to-complying issue suffered from three fundamental errors.

First, despite finding 48 Works were *not* essential to complying with the law, the court did not appear to factor that conclusion into its overall fair use balancing. Brief Appendix § B.3. The court held Public.Resource.Org could post *all* of those Works. Brief Appendix §§ F.1-F.2. In other words, the factor-one analysis not only did not change the court’s bottom-line conclusion, but the court gave no indication that it even weighed this factor into its ultimate holding. Public.Resource.Org did not need to prevail on every fair use factor, but it is inexplicable how Public.Resource.Org could prevail on a defense predicated on “inform[ing] the public about the law,” *ASTM II*, 896 F.3d at 453, for Works the court concluded were not the law.

Second, as to 182 of the Works, the court did not consider which specific *portions* were essential to complying with the law. This Court was explicit that Public.Resource.Org’s fair use defense could justify “reproduc[ing] in full the *relevant portions* of th[e] particular standard” that were “essential to comprehending one’s legal duties.” *ASTM II*, 896 F.3d at 450 (emphasis added). With only three exceptions, *see JA* \_\_\_, \_\_\_, \_\_\_ (District Court Appendix ¶¶1, 85, 122), however, the district court did not engage in any portion-by-portion analysis on the first factor. As explained above, Plaintiffs provided groupings of particular portions of standards

for which Public.Resource.Org’s transformative use argument failed, identifying numerous (1) portions of standards that were non-mandatory, and (2) instances where a standard was incorporated in such a way that only parts of it could be considered relevant to complying with the law. *See* pp. 20-23, *supra*. The district court disregarded this framework and the extensive record Plaintiffs developed in support.

As to the non-mandatory sections of *all* 185 Works, the decision says nothing in response to Plaintiffs’ arguments and the hundreds of supporting examples they provided. A section of an IBR’d standard regarding NFPA’s history or ASHRAE’s goals concerning the environmental impact of its activities, JA\_\_\_\_, \_\_\_\_ (2d. Supp. SMF ¶¶63, 76), could not “help inform one’s understanding of the law,” much less be “essential to complying with any legal duty.” *ASTM II*, 896 F.3d at 450.

As to incorporations that make only portions of standards relevant, for 182 of 185 Works, the court responded that the incorporating regulation did not “specify that only certain provisions” are incorporated or “indicate which specific provisions... are relevant for compliance.” Brief Appendix §§ A.1-A.3; *see also* Brief Appendix § D.1. In other words, because almost no regulations use the magic words “only X, Y, and Z provisions are incorporated by reference,” the court deemed the *entirety* of (sometimes hundreds-of-pages) standards “essential” to comprehending those regulations. That illogical conclusion cannot be squared with

*ASTM II*. There, this Court discussed the example of 46 C.F.R. § 39.1005(h)(1), which incorporates NFPA 70 (2011) for § 39.2009(a)—though without specifying that any particular sections are incorporated. Section 39.2009(a), in turn, dictates that certain cargo tank barges should meet “NFPA 70, Articles 406.9 and 501-145.” 46 C.F.R. § 39.2009(a)(1)(iii)(B). This Court said that the regulation might justify reproducing *those two* provisions. *ASTM II*, 896 F.3d at 450, 452. Section 39.1005(h)(1) does not “specify that only certain provisions” were incorporated, but this Court did not say or suggest this could justify Public.Resource.Org posting the *entirety* of the standard.

Plaintiffs gave numerous examples of analogous regulations. In some instances, the regulation specifically refers to a particular portion of the standard—*e.g.*, the regulation that refers to specific portions of table X-2 in ASTM B85. *See* pp. 20-21, *supra*. In other instances, the regulation’s scope makes clear that only portions of that standard are relevant—*e.g.*, while parts of NFPA 101 (2003) may be necessary to comply with 38 C.F.R. § 39.63 (2011)’s requirement that veterans cemeteries meet the “[a]rchitectural and structural requirements” of that standard, surely Chapter 16, specifying rules for “New Day-Care Occupancies” is not. *See* p. 21, *supra*.

The district court did not address any of this evidence.<sup>9</sup> Its reasoning collapses largely into just whether the standard had been IBR'd or not, contrary to this Court's direction to examine "*the way in which* [standards] are incorporated," *ASTM II*, 896 F.3d at 449 (emphasis added).

Third, the district court failed to explain its conclusions that certain Works were essential to complying with the law, while others were not. For 180 of the 185 Works, the court said the standard either was or was not essential for complying with legal duties—but never adequately explained its summary conclusion. Brief Appendix §§ B.1-B.3. It is impossible to know why the district court reached those conclusions—as inconsistencies in its decision make particularly plain. To take just a few:

- The court concluded that Public.Resource.Org could reproduce only Test Methods A and B of ASTM D2036 (1998) because the incorporating regulation stated that the “full text of the referenced test procedures are incorporated by reference,” and the regulation referenced only test methods A and B. JA\_\_\_\_ (District Court Appendix ¶1 (quoting 40 C.F.R. § 136.3(a) (2003))). But precisely the same regulation incorporates only specified test procedures from ASTM D1688 (1995) and ASTM D512 1989 (1999), and the district court held that Public.Resource.Org could produce those standards in full. JA\_\_\_\_, \_\_\_\_ (District Court Appendix ¶¶85, 122).

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<sup>9</sup> The district court stated that it “d[id] not rely on the disputed evidence.” JA\_\_\_\_ (Memorandum Opinion 9 n.3). To the extent the court failed to account for Plaintiffs’ evidence without any articulated basis for doing so, the refusal to consider such evidence constitutes reversible error. *See Klein*, 216 F.3d at 575.

- The district court held that ASTM F715 (1995) and ASTM F715 1981 (1986) were incorporated as “discretionary procedure[s] because entities may comply with the regulation by relying on ‘other test[s] approved by the Coast Guard.’” JA \_\_\_ - \_\_\_ (District Court Appendix ¶¶150-51 (citing 33 C.F.R. Pt. 154, App. C, § 2.3.1 (1999); 33 C.F.R. Pt. 154, App. C, § 2.3.1 (2014))). By contrast, the court found that ASTM F631 (1993) and ASTM F631 1980 (1985) “provide[d] information essential for... comprehend[ing]... legal duties.” JA \_\_\_ - \_\_\_ (District Court Appendix ¶¶148-49). Yet the F631 standards are *also* incorporated as merely one *option*: a regulated entity may comply with the incorporating regulation by, *inter alia*, (1) using a formula expressly stated in the regulation, (2) using the standard, or (3) using “an equivalent test approved by the Coast Guard.” 33 C.F.R. Pt. 154, App. C, §§ 6.2-6.3 (1999); 33 C.F.R. Pt. 154, App. C, §§ 6.2-6.3 (2014); JA \_\_\_ - \_\_\_ (District Court Appendix ¶¶148-49). If anything, then, the F631 standards are even more discretionary than the F715 standards, as complying with the regulations related to the F631 standards does not even require the Coast Guard to approve another test—the regulatory text already provides a way of complying.
- The court, without explanation, rejected Plaintiffs’ argument that 40 C.F.R. Appendix D to Part 75 (2010) incorporated ASTM D1217 as a reference procedure. *See* p. 22, *supra*. That holding is difficult to square with the court’s finding that 48 Works were incorporated as discretionary or reference procedures. And it cannot be explained by any convincing rebuttal specific to that standard: Public.Resource.Org did not engage in any standard-specific arguments. It is impossible to know why the district court held this standard was essential to complying with the law because it did not say.

Plaintiffs *do not* (and *did not*) argue that the district court had to examine every line of every standard to determine what was “essential to complying” with the law. *ASTM II*, 896 F.3d at 450. Nor do Plaintiffs suggest the court had to address every example they provided as to every standard. The court could have analyzed a few standards Plaintiffs argued were reference procedures and explained why it accepted

some arguments but not others. Or it could have “direct[ed] the parties... to file briefs addressing whether the standards are susceptible to groupings that are relevant to the fair use analysis.” *Id.* at 449. Indeed, following this Court’s direction, *see id.*, Plaintiffs *did* propose various ways of grouping the standards. *See, e.g.*, JA \_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶52-57, 59, 62-68, 70-76); JA \_\_\_\_-\_\_\_\_ (3d. Supp. SMF ¶¶7-9). Public.Resource.Org, by contrast, “poorly served the court,” *ASTM II*, 896 F.3d at 449, by refusing to engage in the analysis this Court directed and, instead, insisting that its use of the entirety of any standard that had been IBR’d was fair. *See* pp. 12-13, *supra*.

To be sure, the required fair use analysis is substantial. But that is only because the scope of Public.Resource.Org’s infringement is so massive. The fact that Public.Resource.Org appropriated hundreds of works does not excuse Public.Resource.Org from its burden of proving transformativeness or justify the district court’s truncated analysis. The court’s failure to grapple with Plaintiffs’ arguments regarding the reasons standards and portions thereof are not essential for legal compliance was error.

2. *Under the “circumstances” of Public.Resource.Org’s copying and distribution, Public.Resource.Org’s use is not transformative because Plaintiffs already make their standards freely available.*

a. A transformative use “adds something new, with a further purpose or different character” from the original work. *Campbell*, 510 U.S. at 579. The

pertinent question is whether a defendant's use of a work "serves a new and different function from the original work and is not a substitute for it." *Authors Guild, Inc. v. HathiTrust*, 755 F.3d 87, 96 (2d Cir. 2014). And that inquiry is an objective one focused on "how the work in question appears to the reasonable observer, not simply what an [accused infringer] might say about a particular piece or body of work." *Cariou v. Prince*, 714 F.3d 694, 707 (2d Cir. 2013).

The prior panel recognized that the context of Public.Resource.Org's copying matters for this analysis, directing consideration of whether "*in certain circumstances*, distributing copies of the law for purposes of facilitating public access could constitute transformative use." *ASTM II*, 896 F.3d at 450 (emphasis added). The circumstances here are that Plaintiffs make all of the IBR'd Works available for free, read-only access in their online reading rooms. *See JA* \_\_\_ (2d. Supp. SMF ¶85).<sup>10</sup> Plaintiffs do so to "provid[e] a resource for individuals to educate

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<sup>10</sup> At the time Plaintiffs moved for summary judgment, the only Works that were not available in Plaintiffs' reading rooms were certain ASTM standards for which ASTM was not aware of any IBR'ing regulation. *See JA* \_\_\_ (3d. Supp. SMF ¶9). In Public.Resource.Org's summary judgment filings, it, for the first time, identified regulations IBR'ing some of those standards. Consistent with ASTM's policy of making IBR'd standards available to the public for free, *JA* \_\_\_ (SMF ¶63), ASTM placed those standards in its reading room. At present, the only Works that are not available in Plaintiffs' reading rooms are certain ASTM standards where a regulation IBR's a substantively identical ASTM standard; in those instances, the substantively identical ASTM standard (*i.e.*, the one actually IBR'd) is available in ASTM's reading rooms.

themselves as to the contents of standards, including standards that have been incorporated by reference.” JA\_\_\_\_ (2d. Supp. SMF ¶86); *see also* JA\_\_\_\_ (SMF ¶101), JA\_\_\_\_ (2d. Supp. SMF ¶90) (describing other tools Plaintiffs developed to educate the public about incorporated standards). Under these circumstances, Public.Resource.Org’s copies serve no purpose beyond Plaintiffs’ copies. Far from meeting the standard for transformativeness, Public.Resource.Org admittedly just offers an inferior substitute for what Plaintiffs already provide. *See* JA\_\_\_\_ (2d. Supp. SMF ¶20) (Public.Resource.Org’s copies of standards direct readers to consult with standards development organizations or governments for “definitive versions”); JA\_\_\_\_ (2d. Supp. SMF ¶¶13-18) (discussing errors in Public.Resource.Org’s postings); *see also, e.g.*, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶37) (Public.Resource.Org posting stating standard had been IBR’d by non-existent section of C.F.R.). While the analysis might be different if an organization *did not* make its works accessible at no charge, the context here matters.

b. The district court’s opinion does not address whether, under the circumstances, Public.Resource.Org’s unauthorized copying serves “a further purpose or different character” from Plaintiffs’ free-access offerings. *Campbell*, 510 U.S. at 579. The decision considered only whether Public.Resource.Org had posted material that was “essential to comprehending one’s legal duties,” but it never addressed whether—even if Public.Resource.Org had—that conduct would add any

purpose or character beyond Plaintiffs' activities. JA \_\_\_\_ (Memorandum Opinion 27 (citation omitted)).<sup>11</sup> Skipping over that critical predicate question was error. It cannot be transformative for an unauthorized use to merely duplicate the copyright holder's use. Because that is all Public.Resource.Org does, its use is not transformative.

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In short, the district court's analysis of the first fair use factor neither follows this Court's instructions nor provides any meaningful basis for this Court's review. For each of the Works, Plaintiffs have identified reasons that the Work or significant portions thereof are definitively *not* essential to complying with the law such that factor one should weigh against fair use. At the least, however, there are genuine factual disputes that preclude summary judgment in favor of Public.Resource.Org.

**B. Factor 2: The “nature of the copyrighted works” does not favor fair use.**

The second fair use factor (“the nature of the copyrighted work”) asks whether the work is “close[] to the core of intended copyright protection.” *Campbell*, 510 U.S. at 586. Plaintiffs' standards are original and complex works that take enormous

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<sup>11</sup> As to each standard, the district court repeated this Court's statement that Public.Resource.Org's “attempt to freely distribute standards incorporated by reference into law qualifie[s] as a use that further[s] the purposes of the fair use defense.” Brief Appendix n.2. But that statement was about Public.Resource.Org's non-profit status, not whether its use was transformative. *See ASTM II*, 896 F.3d at 449.

resources to produce and that serve important public functions, including promoting public safety, supporting building and construction, and advancing product testing.

*See, e.g.*, JA\_\_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_ (SMF ¶¶43-44, 104-05, 152, 164-67, 266).

Indeed, it is for that reason that voluntary consensus standards have been IBR'd in tens of thousands of instances and form a critical part of the United States' regulatory landscape. *See* p. 8, *supra*. Providing an incentive for Plaintiffs to develop and publish these standards is at the core of copyright law. Additionally, this Court's previous opinion emphasized that this factor "demands an individual appraisal of each standard and its incorporation" to determine whether the standard has been incorporated in a way that makes it "virtually indistinguishable" from being "expressly copied into law." *ASTM II*, 896 F.3d at 451-52.

The district court failed to conduct that individualized inquiry. For 181 of the 185 Works, the district court asserted that the standard was incorporated "without limitation[], such that 'the consequence of the incorporation by reference is virtually indistinguishable from a situation in which the standard had been expressly copied into law.'" Brief Appendix § C.1. As to the remaining four Works, the court held that the standard was only partially incorporated, making Public.Resource.Org's copying "harder to justify." Brief Appendix § C.2.

But many standards other than the four the district court identified are also at best "only partially incorporated." For instance, the IBR'ing regulation for ASTM

D1688 is the same one that the court held only partially incorporated four of the Works, but the court inexplicably held D1688 was incorporated “without limitation.”

*Compare JA\_\_\_\_ (District Court Appendix ¶85), with JA\_\_\_\_-\_\_\_\_, \_\_\_\_-\_\_\_\_, \_\_\_\_ (District Court Appendix ¶¶1, 105-06, 122).* In other instances, the IBR’ing regulations incorporate Works that include portions that have absolutely no relevance to the regulations. *See* pp. 20-21, *supra*. Returning again to 38 C.F.R. § 39.63, its requirement that veterans cemeteries meet the “[a]rchitectural and structural requirements” of NFPA 101 (2003) is not “indistinguishable” from a regulation that “expressly copied into law” the standard’s chapter on day-care occupancies—that chapter is entirely irrelevant to the regulation. *ASTM II*, 896 F.3d at 452.

Moreover, as with factor one, even for the four Works where the district court held that this factor did not favor fair use, it reached the same ultimate conclusion, holding that Public.Resource.Org could copy them. It is thus, again, unclear how, if at all, the court weighed this factor into the fair use analysis.

**C. Factor 3: Public.Resource.Org copies and posts entire Works without attempting to limit its distribution to those portions of Works that are essential to complying with the law.**

The third fair use factor looks to “the amount and substantiality of the portion used in relation to the copyrighted work as a whole.” 17 U.S.C. § 107(3). “While ‘wholesale copying’ like Public.Resource.Org’s “does not preclude fair use per

se,’ copying an entire work ‘militates against a finding of fair use.’” *Worldwide Church of God v. Philadelphia Church of God, Inc.*, 227 F.3d 1110, 1118 (9th Cir. 2000) (citation omitted). As the quantity of copied material increases, so too does the likelihood that the copy “could serve [someone] as an effective, free substitute for the purchase.” *Authors Guild v. Google, Inc.*, 804 F.3d 202, 222 (2d Cir. 2015).

This Court instructed the district court to consider whether Public.Resource.Org had “limit[ed] its copying to only what is required to fairly describe the standard’s legal import” and, “where the incorporation merely makes reference” to the standard, whether “a paraphrase or a summary” would suffice. *ASTM II*, 896 F.3d at 452. As explained above, Public.Resource.Org has not even attempted to so limit its copying. It always posts the *entirety* of each of the Works—some of which run hundreds of pages long. *See JA*\_\_\_\_ (2d. Supp. SMF ¶32). Public.Resource.Org’s copying and distribution of large quantities of material that “does not govern any conduct” makes this factor lean decidedly in Plaintiffs’ favor. *ASTM II*, 896 F.3d at 452.

Again, the district court did not do what this Court required. The district court asserted that “this third inquiry is ill-suited to wholesale resolution,” *JA*\_\_\_\_ (Memorandum Opinion 29), but then copied and pasted nearly identical analyses about the *entirety* of 182 of the 185 Works, asserting that because the incorporating regulation “does not specify that only certain provisions” are IBR’d or “indicate

which specific provisions of the standard are relevant for regulatory compliance... ‘a greater amount of the standard’s text might be fairly reproduced,’” Brief Appendix § D.1. That reasoning runs headlong into this Court’s prior opinion, which recognized that only portions of standards might be relevant even where a regulation did not state that “only certain provisions” were being incorporated. *See* pp. 27-28, *supra*. Whatever is necessary to “fairly describe” the “legal import” of a standard incorporated for a veterans-cemetery regulation, a chapter on day-care occupancies is not it.

Moreover, this Court stated that this factor might not support fair use for standards that were incorporated as reference procedures, *see ASTM*, 896 F.3d at 452, yet the district court held that each of the 48 Works it concluded were incorporated as reference procedures could be copied in full. *Compare* Brief Appendix § B.3, *with* §§ D.1 & F.1. And non-mandatory portions of a standard—like informational appendices and notes that are expressly “not enforceable as requirements” or lists of changes from a prior version of a standard, *see* pp. 22-23, *supra*—“do[] not govern any conduct,” *ASTM II*, 896 F.3d at 452, yet the district court ignored those portions in examining this factor.

Looking to the three Works where the district court applied standard-specific reasoning only makes its analysis harder to follow. The court concluded that the incorporation of ASTM D2036 (1998) supported posting only the test procedures

that the regulation referenced, because the incorporating regulation stated that the “full text of the referenced test procedures are incorporated by reference.” JA\_\_\_\_ (District Court Appendix ¶1 (quoting 40 C.F.R. § 136.3(a) (2003))). But the same regulatory language incorporates specific test procedures in ASTM D1688 (1995) and ASTM D512 1989 (1999), and the district court concluded that, for those Works, “copying and republishing the standard’s background sections and appendix ‘are reasonable in relation to the purpose of the copying.’” JA\_\_\_\_, \_\_\_\_ (District Court Appendix ¶¶85, 122 (quoting *Campbell*, 510 U.S. at 586-87)). If the background and appendix were not necessary to describe the legal import of D2306, then they are not necessary to describe the legal import of D1688 and D512. The unexplained inconsistency in the court’s analysis demonstrates the need for further review on remand.

**D. Factor 4: Public.Resource.Org’s substitutional use undermines the actual and potential markets for Plaintiffs’ Works.**

The fourth fair use factor—harm to the copyright owner’s “potential market[s]” or the “value of the copyrighted work,” 17 U.S.C. § 107(4)—requires the Court to consider ““whether unrestricted and widespread conduct of the sort engaged in by the defendant... would result in a substantially adverse impact on the potential market”” for both the original and derivative works. *Campbell*, 510 U.S. at 590 (citation omitted); *Harper & Row Publishers, Inc. v. Nation Enterprises*, 471 U.S. 539, 568 (1985). The district court concluded that this factor weighed in favor of

fair use, but it did so based on the premise that it was *Plaintiffs'* burden to prove market harm. That is not the law. Public.Resource.Org bears the burden on each of the four factors of its affirmative defense, including market harm. Public.Resource.Org did not meet that burden. This Court should either reverse the district court's ruling as to market harm or remand for an analysis under the appropriate framework.

1. *Public.Resource.Org bears the burden on the fourth fair use factor.*

Fair use is an affirmative defense. *Campbell*, 510 U.S. at 590; *Harper & Row*, 471 U.S. at 561. A defendant accordingly bears the burden on each of its factors—including the fourth one. The Supreme Court was explicit on this point in *Campbell*, explaining that “[s]ince fair use is an affirmative defense, its proponent would have difficulty carrying the burden of demonstrating fair use without favorable evidence about relevant markets.” 510 U.S. at 590.

The district court erred in ruling otherwise. It appeared to reason that *Campbell* was limited to the commercial context and that the Supreme Court's earlier decision in *Sony Corporation of America v. Universal City Studios, Inc.*, 464 U.S. 417 (1984), dictates that a plaintiff bears the burden on the fourth factor where a use is noncommercial. *See JA* \_\_\_\_ (Memorandum Opinion 30). But that is not what *Campbell* says: it makes an across-the-board statement about the factor-four burden. *See Cambridge Univ. Press v. Patton*, 769 F.3d 1232, 1280 n.36 (11th Cir.

2014) (rejecting argument that “the *Campbell* court was dealing with commercial use and did not disapprove *Sony*’s shifting of the burden in noncommercial cases” and noting *Campbell* “Court’s unqualified statement”). Moreover, “[t]he portion of *Sony*” on which the district court relied “discusses a presumption that commercial uses are not fair use and noncommercial uses are fair use,” but *Campbell* “clarified that such presumptions have no place in the fair use analysis.” *Id.*; *see JA* \_\_\_ (Memorandum Opinion 30 (quoting *Sony*, 464 U.S. at 451)); *see also Bell v. Eagle Mountain Saginaw Indep. Sch. Dist.*, 27 F.4th 313, 324 n.4 (5th Cir. 2022) (“Although some courts once interpreted *Sony* as creating a presumption of *de minimis* harm for nonprofit uses, the Supreme Court has since clarified that no such presumption exists.” (citations omitted)). Other circuits have thus concluded following *Campbell* that the burden on the fourth factor rests with the defendant, even in cases of noncommercial use. *See Bell*, 27 F.4th at 324 n.4; *Cambridge Univ. Press*, 769 F.3d at 1280 & n.36; *see also* 4 *Patry on Copyright* § 10:148.<sup>12</sup>

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<sup>12</sup> The district court rested its contrary conclusion on two pre-*Campbell* opinions (one a concurrence) and a Ninth Circuit decision from 2014. *See JA* \_\_\_ (Memorandum Opinion 30 (citing, *inter alia*, *Fox Broad. Co. v. Dish Network LLC*, 747 F.3d 1060 (9th Cir. 2014))). But the Ninth Circuit has subsequently clarified that it has “never adopted th[e] view” that it might “sometimes [be] ‘reasonable to place’” even the burden of production on a plaintiff. *Dr. Seuss Enterprises, L.P. v. ComicMix LLC*, 983 F.3d 443, 459 n.6 (9th Cir. 2020) (quoting *Cambridge Univ. Press*, 769 F.3d at 1279). *Dr. Seuss* correctly recognized *Campbell*’s rejection of presumptions and that it “squarely forecloses” an argument that a copyright plaintiff must “prove potential market harm.” *Id.* at 459. And any discussion in *Fox*, on which the district court relied, about the market-harm burden was, at most, dicta, as

Public.Resource.Org bears the burden on the fourth factor and the district court's contrary ruling should be reversed.

2. *Public.Resource.Org did not meet its burden.*

With the burden properly allocated, the fourth factor heavily favors Plaintiffs.<sup>13</sup>

a. Both common sense and the summary judgment evidence demonstrate that widespread use similar to Public.Resource.Org's would be detrimental to Plaintiffs' markets. *See Cambridge Univ. Press*, 769 F.3d at 1276 ("The central question... is not whether Defendants' use of Plaintiffs' Works caused Plaintiffs to lose some potential revenue. Rather, it is whether Defendants' use—taking into account the damage that might occur if 'everybody did it'—would cause *substantial* economic harm...."). As the district court explained in its initial decision, users can choose between purchasing a standard from Plaintiffs or downloading "an identical standard for no cost [from Public.Resource.Org]. *The only logical conclusion is that this choice negatively impacts the potential market for Plaintiffs' standards.*" *ASTM I*, 2017 WL 473822 at \*18 (emphasis added). The only expert evidence as to market harm confirmed that logical inference: Plaintiffs' expert concluded that "Plaintiffs

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*Fox* held that the alleged market harm did not even result from activity that "implicate[d] any copyright interest." *Fox*, 747 F.3d at 1069.

<sup>13</sup> Even if Plaintiffs did bear the burden, Plaintiffs raised a genuine issue of material fact with respect to this factor, precluding summary judgment.

are likely to stand to lose a majority of their revenue and gross profits from the loss of copyright protection here.” JA\_\_\_\_ (Jarosz Report ¶138); *see also* JA\_\_\_\_-\_\_\_\_ (Jarosz Report ¶¶130-49).

Public.Resource.Org never offered any evidence in rebuttal, either initially or on remand—even though the absence of “favorable evidence about relevant markets” makes it “difficult[]” for a defendant to show fair use. *Campbell*, 510 U.S. at 590. At a minimum, it was error to conclude that uses like Public.Resource.Org’s were, as a matter of law, *not* likely to cause market harm. *See id.* at 594 (“[I]t is impossible to deal with the fourth factor except by recognizing that a silent record on an important factor bearing on fair use disentitled the proponent of the defense... to summary judgment.”).

b. In its previous opinion, this Court directed the district court to consider three questions relating to this factor. Plaintiffs’ unrebutted evidence as to each question demonstrates that Public.Resource.Org cannot meet its burden of demonstrating this factor weighs in its favor as to *any* Work.

First, this Court urged consideration of whether Public.Resource.Org’s activities could lead to “additional [market] harm” where Plaintiffs themselves offer free access online “presumably... without entirely cannibalizing sales of their standards.” *ASTM II*, 896 F.3d at 453. Plaintiffs’ provision of free online access *advances* their market for disseminating their standards. Plaintiffs offer their

standards in a read-only format: this carefully controlled environment, designed to be educational and informational, does not substitute or compete in the commercial marketplace for the sale of less restricted versions of Plaintiffs' standards. JA\_\_\_\_ (2d. Supp. SMF ¶¶85, 88). As Plaintiffs' expert explained, "parties that are interested in or affected by [Plaintiffs' standards], but who do not necessarily need a digital or hardcopy of the standards" are well served by Plaintiffs' online versions. JA\_\_\_\_ (Jarosz Rep. ¶86). By contrast, Plaintiffs' websites would not be a substitute for purchasing a downloadable and searchable copy from Plaintiffs for industry professionals and tradespeople who purchase the standards to use in their work. JA\_\_\_\_ (Jarosz Rep. ¶¶88-89). Indeed, Plaintiffs view the provision of free access as furthering their overall mission by encouraging more users to visit Plaintiffs' websites, and to do so more frequently, thus creating opportunities for website visitors to learn about Plaintiffs' other mission-driven activities and potentially to purchase the materials so they can have a copy to download. JA\_\_\_\_-\_\_\_\_ (Jarosz Rep. ¶¶86-87).

Public.Resource.Org's postings, by contrast, substitute for and cannibalize Plaintiffs' sales, licensing efforts, and free access distribution. Public.Resource.Org intentionally makes its versions of Plaintiffs' standards—which are widely viewed, *see, e.g.*, JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶98, 102)—available on an anonymous and unrestricted basis. JA\_\_\_\_, \_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶¶92, 104). This means its users

include those individuals and entities who would otherwise purchase or license copies of Plaintiffs' standards. JA\_\_\_\_ (2d. Supp. SMF ¶93). Its users also include *further* infringers who, by virtue of the anonymity Public.Resource.Org and the Internet Archive offer, can easily profit unlawfully from selling Public.Resource.Org's copies. *See* JA\_\_\_\_ (2d. Supp. SMF ¶¶105-06);<sup>14</sup> JA\_\_\_\_ (SMF ¶240); *see also BMG Music v. Gonzalez*, 430 F.3d 888, 890 (7th Cir. 2005) (noting that because “[m]usic downloaded for free from the Internet is a close substitute for purchased music[,] many people are bound to keep the downloaded files without buying originals”). That Plaintiffs' free access does not entirely cannibalize their sales does not mean that Public.Resource.Org's free substitute is not a serious threat to Plaintiffs' ability to generate revenue from their standards.

Second, the Court asked whether there would continue to be a market for Plaintiffs' standards if, when “only a few select provisions of a much longer standard” are IBR'd, Public.Resource.Org limited its copying to only IBR'd provisions. *ASTM II*, 896 F.3d at 453. Public.Resource.Org has no supporting

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<sup>14</sup> The district court held that this argument was “tenuous” because Plaintiffs had not shown that third parties were infringing as “a result of Defendant’s actions.” JA\_\_\_\_ (Memorandum Opinion 32 (citing 2d. Supp. SMF ¶¶105-06)). Even if that did not misconstrue the appropriate burden, it is wrong: Plaintiffs presented evidence that third parties were charging for access to ASTM standards that included the Public.Resource.Org cover sheet—*i.e.*, for copies that came from Public.Resource.Org. JA\_\_\_\_ (2d. Supp. SMF ¶¶105-06).

evidence to answer this question because, as demonstrated, Public.Resource.Org does *not* so limit its copying and has maintained that position since the remand, despite this Court’s direction that Public.Resource.Org should revisit its wholesale copying. Accordingly, Public.Resource.Org failed to meet its burden on this question.

Third, this Court directed the district court to consider whether Public.Resource.Org’s conduct would harm any markets for derivative works, *e.g.*, if Public.Resource.Org’s posting of out-of-date standards would help or harm the market for the current versions of the same standards. *See ASTM II*, 896 F.3d at 453. The evidence is undisputed that Public.Resource.Org’s use harms the market for the current and most up-to-date works which Plaintiffs both distribute directly and through authorized licensees. ASTM frequently reapproves the identical standard in an updated version, making the old version a perfect substitute for the up-to-date version. JA\_\_\_\_ (2d. Supp. SMF ¶96). Even when standards are revised in subsequent versions, the latest frequently retains substantial portions of the prior version. JA\_\_\_\_-\_\_\_\_ (2d. Supp. SMF ¶35). As a result, a copy of the prior version may be a perfect or near-perfect substitute for the current version, such that the unrestricted download and distribution of Plaintiffs’ standards will interfere with the authorized market for these derivative works. JA\_\_\_\_ (2d. Supp. SMF ¶96).

The evidence also shows that Public.Resource.Org does not limit its copying to out-of-date standards. Many jurisdictions incorporate—and Public.Resource.Org promptly posts—the most recently published versions of Plaintiffs' standards. *See, e.g.*, 30 Tex. Admin. Code § 217.326 (incorporating most recent version of NFPA 1 and NFPA 70); Alaska Stat. Ann. § 44.42.067(b)-(c) (same for ASHRAE 90.1). For example, after the parties filed their initial summary judgment motions, NFPA published the NFPA 70 (2017). Public.Resource.Org has now copied and distributed that version. JA\_\_\_\_ (2d. Supp. SMF ¶110). The undisputed evidence on this question—like the prior two—reveals that Public.Resource.Org cannot meet its burden on the fourth fair use factor.

\* \* \*

This Court viewed fair use as a “narrow[] approach” that would “limit[] the economic consequences that might result from [Plaintiffs] losing copyright” and “avoid[] creating... *sui generis* caveats to copyright law for incorporated standards.” *ASTM II*, 896 F.3d at 447. The district court’s opinion, however, is anything but narrow. Under the district court’s approach, any time a regulation IBR’s a standard in any way without expressly limiting its IBR to a portion of the standard, it is fair use for Public.Resource.Org to post the entirety of that standard. In other words, the district court adopted precisely the “bright-line rule” this Court sought to avoid through fair use, threatening disastrous “economic consequences” for Plaintiffs and

their important public-interest work<sup>15</sup> and creating a “*sui generis* caveat[] to copyright law for incorporated standards.” *Id.* at 446-47. This Court should not allow that decision—and its far-reaching consequences—to stand.

## **II. The District Court Abused Its Discretion In Not Enjoining Public.Resource.Org From Future Infringement Of Plaintiffs’ Copyrights.**

A court may grant “final injunctions on such terms as it may deem reasonable to prevent or restrain infringement of a copyright.” 17 U.S.C. §502(a). When assessing entitlement to a permanent injunction, a court must look to a plaintiff’s evidence “(1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.” *eBay Inc. v. MercExchange, LLC*, 547 U.S. 388, 391 (2006). Here, each of these four factors weighs in favor of enjoining future copyright

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<sup>15</sup> The district court’s decision loses sight of this Court’s concern about the “economic consequences” that might follow if competitors were permitted to “sell duplicates at a lower cost.” *ASTM II*, 896 F.3d at 447. That concern is anything but hypothetical: Using Public.Resource.Org’s “IBR’d standards are the law” playbook, UpCodes, Inc., a venture-capital-backed startup, copies and posts dozens of privately developed standards (including NFPA’s and ASHRAE’s) and attempts to sell industry professionals a paid “premium” service that allows them to access the standards using various features—all without even an attempt at licensing or authorization from the copyright owners. *See UpCodes, Inc.*, 2021 WL 4913276, at \*1-3. And UpCodes, just like Public.Resource.Org, claims that this activity constitutes fair use. *See id.* at \*2.

infringement. The district court abused its discretion in refusing to enjoin Public.Resource.Org from engaging in future copyright infringement. That ruling should be reversed.

**A. The district court correctly found that remedies available at law are inadequate and the balance of hardships favors an injunction.**

As the district court correctly concluded, the second and third *eBay* considerations favor an injunction. JA\_\_\_\_-\_\_\_\_ (Memorandum Opinion 46-47). First, money damages are inadequate both because the types of harms Plaintiffs have suffered (e.g., harm to their goodwill and threats to their business models) and the amounts of that harm (given the likelihood of down-the-line infringement) are difficult to quantify, and because Public.Resource.Org’s limited assets are plainly insufficient to pay the potential damages. JA\_\_\_\_-\_\_\_\_, \_\_\_\_ (SMF ¶¶241-44, 272-73); JA\_\_\_\_, \_\_\_\_ (2d. Supp. SMF ¶¶92, 111); *see Bell Helicopter Textron Inc. v. Airbus Helicopters*, 78 F. Supp. 3d 253, 274-75 (D.D.C. 2015) (“losses to... customer base and reputation defy attempts at valuation[] and are unlikely to be remedied through a simple damages calculation” (citations omitted)). Second, as Public.Resource.Org has admitted, it will face no financial harm if forced to stop posting Plaintiffs’ copyrighted standards. JA\_\_\_\_ (SMF ¶277). The balance of hardships thus “weighs strongly in favor of an injunction.” JA\_\_\_\_ (Memorandum Opinion 47).

**B. The district court correctly found at least some irreparable harm and a public interest that favors an injunction.**

The district court also found that Plaintiffs had shown irreparable harm—though “meager”—and thus met the first factor. JA\_\_\_\_-\_\_\_\_ (Memorandum Opinion 45-47). As explained in the next section, the district court plainly erred by not recognizing that (1) the irreparable harm took several forms and (2) far exceeded the “meager” label it was given. That error should be corrected on appeal. Nonetheless, the district court found at least a threshold amount of irreparable harm.

On the fourth factor, the district court correctly found that an injunction serves the “policy interests that underlie the Copyright Act itself” by preserving the necessary financial incentives to “ensure continued development of technical standards.” JA\_\_\_\_ (Memorandum Opinion 47). It went on, however, to assert that the public interest would be disserved if the standards at issue were later IBR’d. JA\_\_\_\_ (Memorandum Opinion 47). As explained below, *see* pp. 55-56, *infra*, giving that speculative possibility significant weight was error.

In short, the district court found all four factors, at least in part, supported Plaintiffs. Once the errors as to the first and fourth factors are corrected, *see* pp. 51-56, *infra*, entry of a permanent injunction is the only outcome that the record can reasonably support.

**C. The district court erred in not recognizing that Plaintiffs had proven several types of substantial irreparable harm.**

1. *Public.Resource.Org's copyright infringement threatens Plaintiffs' business models.*

Public.Resource.Org's activities threaten severe economic harm to Plaintiffs.

*See* pp. 42-47, *supra*. That economic harm, in turn, poses a threat of irreparable injury through shifts it may force to Plaintiffs' business models. *See Disney Enterprises, Inc. v. VidAngel, Inc.*, 869 F.3d 848, 866 (9th Cir. 2017) (finding irreparable harm when defendant's services undermined the value of plaintiffs' business model); *Stuller, Inc. v. Steak N Shake Enterprises, Inc.*, 695 F.3d 676, 680 (7th Cir. 2012) (finding irreparable harm where defendant's conduct would force a "significant change to its business model and... would negatively affect its revenue"); *see also Presidio Components, Inc. v. Am. Technical Ceramics Corp.*, 702 F.3d 1351, 1363 (Fed. Cir. 2012) ("Direct competition in the same market is certainly one factor suggesting strongly the potential for irreparable harm without enforcement of the right to exclude.").

Specifically, Plaintiffs' expert's unrebutted opinion was that Public.Resource.Org's actions pose two significant threats to Plaintiffs' existing business models. First, Plaintiffs rely primarily on users of their standards to fund standards development, rather than charging upfront fees before developing a standard. JA\_\_\_\_ (SMF ¶257). That "back-loaded" model presents extremely low

barriers to participating in the standards-creation process. JA\_\_\_\_ (SMF ¶258). Public.Resource.Org’s conduct threatens to force Plaintiffs to shift to a more “front-loaded” system that charges for participation in the standards-creation process, which would preclude the participation of certain stakeholders and increase the risk of industry capture. JA\_\_\_\_ (SMF ¶¶259-60). Second, Plaintiffs currently decide whether to develop standards by considering factors like public safety and industry need—not whether the standard will generate significant revenues. JA\_\_\_\_ (SMF ¶261). If Public.Resource.Org’s conduct continues, Plaintiffs may be forced to focus on developing only the most profitable standards, JA\_\_\_\_ (SMF ¶¶259, 262)—undermining their critical public-interest work.

Additionally, if Public.Resource.Org’s conduct goes unchecked, it will act as a signal to the market that the creation of unauthorized versions of standards is acceptable. That will accelerate the proliferation of new versions of Plaintiffs’ standards on other sites, thereby compounding Plaintiffs’ harm over time. JA\_\_\_\_ (SMF ¶254); *see also* JA\_\_\_\_ (2d. Supp. SMF ¶106), JA\_\_\_\_ (SMF ¶249) (copies of Public.Resource.Org-versions of ASTM standards have been posted to third-party websites). In turn, the pressure for Plaintiffs to change their business models will only increase.

2. *Plaintiffs face irreparable harm to the exclusivity of their rights.*

a. Interference with Plaintiffs' right to prevent repeated infringement is an ongoing irreparable harm. The loss of exclusive control over Plaintiffs' works is magnified by the realities of the online environment where unauthorized copies are repeatedly downloaded and shared. *See Metro-Goldwyn-Mayer Studios, Inc. v. Grokster, Ltd.*, 518 F. Supp. 2d 1197, 1218 (C.D. Cal. 2007) ("every downloader... of the copyrighted works is in turn capable of also transmitting perfect copies of the works.... threatening virtually unstoppable infringement of the copyright." (citations omitted)). Indeed, since the inception of the lawsuit, third parties have posted and charged fees for copies of Plaintiffs' standards obtained from Public.Resource.Org. JA\_\_\_\_ (2d. Supp. SMF ¶¶105-06); JA\_\_\_\_ (SMF ¶249). And there is a serious risk that if Public.Resource.Org's conduct goes unchecked, it will encourage other third parties to create unauthorized versions of Plaintiffs' works. JA\_\_\_\_ (SMF ¶254).

b. The district court wrote off this harm because of Public.Resource.Org's "voluntary removal" of Plaintiffs' standards, many years into the litigation with Plaintiffs. JA\_\_\_\_ (Memorandum Opinion 45). But the "sudden[] reform" where a defendant "simply took the action that best suited him at the time" and stopped only when "he was caught red-handed" does not reduce the likelihood that he will infringe again. *Walt Disney Co. v. Powell*, 897 F.2d 565, 568 (D.C. Cir. 1990) (citation omitted); *see also William R. Warner & Co. v Eli Lilly & Co.*, 265 U.S. 526, 532

(1924) (plaintiff “entitled to relief, is entitled to effective relief; and any doubt... must be resolved... against [defendant], which has shown by its conduct that it is not to be trusted”). Although Public.Resource.Org “voluntarily” removed Plaintiffs’ standards at the district court’s prompting, *see JA*\_\_\_\_ (November 4, 2015 Hearing Tr. 20), Public.Resource.Org has continued to post additional standards owned by Plaintiffs since the lawsuit commenced, and Public.Resource.Org has indicated that it has no intention of stopping its conduct absent intervention from a court. *JA*\_\_\_\_ (SMF ¶¶235-36); *JA*\_\_\_\_ (2d. Supp. SMF ¶110). Moreover, the record is replete with examples of Public.Resource.Org’s reckless and inexact posting of its standards. *See* pp. 10-11, 33, *supra*. The district court erred in concluding that Plaintiffs would be adequately protected absent an injunction.

3. *Public.Resource.Org’s conduct poses substantial reputational harm.*

Finally, Public.Resource.Org’s conduct poses a significant risk of reputational injury because Public.Resource.Org’s versions of Plaintiffs’ standards contain errors that significantly altered the utility of standards. *See, e.g.*, *JA*\_\_\_\_ (SMF ¶219) (describing error in NFPA standard mistaking “M” (an abbreviation for meters) for “IN” (an abbreviation for inches)); *JA*\_\_\_\_ (2d. Supp. SMF ¶¶14-18) (errors have not been fixed by Public.Resource.Org); *Groupe SEB USA, Inc. v. Euro-Pro Operating LLC*, 774 F.3d 192, 204-05 (3d Cir. 2014) (“‘Grounds for irreparable injury include loss of control of reputation, loss of trade, and loss of goodwill.’” (citation omitted)).

The district court itself acknowledged that this form of irreparable harm existed here and found Public.Resource.Org’s claims that it would correct errors to be “hardly reassuring.” JA \_\_\_\_ (Memorandum Opinion 46). While the court connected this finding specifically to Public.Resource.Org’s use of Plaintiffs’ logos, it applies equally to all standards where Public.Resource.Org infringed Plaintiffs’ copyrights. Because Public.Resource.Org identifies these standards as emanating from Plaintiffs, the risk that a reader will attribute erroneous material to Plaintiffs exists regardless of whether Public.Resource.Org also uses Plaintiffs’ trademarked logos.

**D. The district court abused its discretion in allowing the speculative possibility of future IBR to thwart entry of a permanent injunction.**

The district court abused its discretion by finding that the public would be “greatly disserved” by an injunction if the 32 standards were later IBR’d. JA \_\_\_\_ (Memorandum Opinion 47). There is no evidence suggesting that any of these works are likely to be IBR’d in the future. Allowing this future speculative possibility to thwart entry of a permanent injunction was error. *See Stormans, Inc. v. Selecky*, 586 F.3d 1109, 1139 (9th Cir. 2009) (directing the district court to “weigh the public interest in light of the *likely* consequences of the injunction... [which] must not be too remote, insubstantial, or speculative and must be supported by evidence”).

Additionally, the conclusory assertion fails to address that Plaintiffs themselves provide free public access to all of their standards that are IBR’d. JA \_\_\_\_ (2d. Supp. SMF ¶85). Therefore, even if any of those 32 standards were later IBR’d,

the public would have free public access to those standards. After nearly a decade of litigation, the record contains not even a single instance of lack of access to the Plaintiffs' standards that would support finding a “great[] disserv[ice].” Rather, the public is greatly disserved by relying on Public.Resource.Org’s error-ridden copies of Plaintiffs’ standards. *See* pp. 54-55, *supra*.

\* \* \*

In sum, each of the permanent injunction factors weighs in favor of enjoining Public.Resource.Org’s conduct. The district court abused its discretion in denying a permanent injunction, and this Court should remand for entry of a permanent injunction for any of Plaintiffs’ standards that have not been IBR’d. *See Walt Disney*, 897 F.2d at 568 (finding permanent injunction against future infringement of works owned by plaintiff but not in suit appropriate “[w]here... there has been a history of continuing infringement and a significant threat of future infringement remains”).

## CONCLUSION

The Court should (1) vacate the district court's ruling that Public.Resource.Org had shown fair use as to the 185 Works and remand for analysis under the appropriate framework, and (2) reverse the district court's denial of a permanent injunction for the 32 standards where Public.Resource.Org's fair use defense failed.

Dated September 23, 2022

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**CERTIFICATE OF COMPLIANCE**

This brief complies with the type-volume limitation of Rule 32(a)(7)(B). As measured by the word-processing system used to prepare this brief, there are 12,992 words in the brief excluding the parts of the brief exempted by Fed. R. App. P. 32(f) and D.C. Cir. Rule 32(e)(1).

This brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type-style requirements of Fed. R. App. P. 32(a)(6) because it has been prepared in a proportionally spaced typeface in 14 point font.

Dated: September 23, 2022

*/s/ Donald B. Verrilli Jr.*  
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## APPENDIX

## Appendix to Appellants' Brief

### A. Introductory Discussion Regarding Incorporation

| District Court's Analysis  | District Court Appendix Paragraph Nos.      |
|--|---|
| 1. <u>176 Works</u> : An incorporating regulation “does not specify that only certain provisions of [the standard] are incorporated by reference into law” and does not “indicate which specific provisions of [the standard] are relevant for compliance with the regulation.” <sup>1</sup> | 4-16, 18, 20-56, 58, 60-84, 86-121, 123-185 |
| 2. <u>1 Work</u> : An incorporating regulation requires compliance with the standard “generally.”  | 17  |
| 3. <u>1 Work</u> : An incorporating regulation incorporates the standard “in full.”  | 19  |
| 4. <u>3 Works</u> : The incorporating regulation incorporates only certain portions of the standard.   | 1, 85, 122                                  |
| 5. <u>4 Works</u> : The introductory discussion does not include an explicit conclusion about which portions of the standard have been incorporated by reference or are relevant to compliance with the regulation.  | 2-3, 57, 59                                 |

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<sup>1</sup> The district court used slightly different but substantively identical language with respect to some Works. *See, e.g.*, Appendix ¶ 4 (“The regulation does not specify that only certain provisions of ASHRAE 90.1 (2010) are incorporated by reference into law, nor does it indicate which specific provisions of ASHRAE 90.1 (2010) are relevant for *regulatory* compliance with the regulation.” (emphasis added)). For one Work, the district court stated that an incorporating regulation “does not specify which provisions of [the standard] are relevant” to the particular subject matter of the regulation, but did not include a statement that the regulation did not specify that only certain provisions are incorporated. *Id.* ¶ 33.

## B. First Factor<sup>2</sup>

| District Court's Analysis  | District Court Appendix Paragraph Nos.   |
|--|--|
| 1. <u>131 Works</u> : “[T]he incorporated standard provides information essential for a private entity to comprehend its legal duties, which weighs heavily in favor of permitting Defendant’s reproduction.”  | 8-9, 12-20, 22-27, 31, 35-36, 46-47, 54, 56, 58, 60-85, 87-129, 132, 134-141, 143-149, 152-153, 157-161, 164, 169-172, 174, 176-181, 184-185 |
| 2. <u>1 Work</u> : “[T]he incorporated standard provides information essential for a private entity to comprehend its legal duties regarding Test Methods A and B, which weighs heavily in favor of permitting Defendant’s reproduction.”  | 1  |
| 3. <u>48 Works</u> : “[T]he court finds that the incorporated standard does not provide information essential for a private entity to comprehend its legal duties,” but rather is incorporated as a reference or discretionary procedure. “[T]hus, Defendant’s use is less transformative and ‘its wholesale copying, in turn, less justified.’” (quoting <i>ASTM II</i> , 896 F.3d at 450). | 5-7, 11, 21, 28-30, 32-34, 37-45, 48-53, 55, 57, 59, 86, 130-131, 142, 150-151, 154-156, 162-163, 165-168, 173, 175, 182-183                 |
| 4. <u>2 Works</u> : The standard is incorporated as a discretionary procedure, but “provides information essential for a private entity to comprehend its legal duties . . . which weighs heavily in favor of permitting Defendant’s reproduction.”  | 10, 133  |

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<sup>2</sup> For each of the 185 Works, the Appendix includes a substantively identical introductory section. *See, e.g.*, Appendix ¶ 1 (“There is no indication that Defendant stands to profit from republishing this standard; Defendant’s apparent purpose is to inform the public about the law and facilitate public debate. Defendant’s ‘attempt to freely distribute standards incorporated by reference into law qualifie[s] as a use that further[s] the purposes of the fair use defense.’” (quoting *Am. Soc’y for Testing & Materials v. Public.Resource.Org, Inc.*, 896 F.3d 437, 449 (D.C. Cir. 2018) (*ASTM II*)) (citing *ASTM II*, 896 F.3d at 449; PRO Second Motion for Summary Judgment 16, Dkt. 202)).

| District Court's Analysis  | District Court Appendix<br>Paragraph Nos. |
|--|---|
| 5. <u>3 Works</u> : “[T]he regulation does not incorporate the standard in a manner that requires a private entity to comprehend the standard to comply with its legal duties. . . . Allowing public access to [the standard] facilitates public debate . . . .” | 2-4                                       |

### C. Second Factor<sup>3</sup>

| District Court's Analysis   | District Court Appendix<br>Paragraph Nos. |
|---|---|
| 1. <u>181 Works</u> : PRO posted text that was “incorporated into law without limitation[] such that ‘the consequence of the incorporation by reference is virtually indistinguishable from a situation in which the standard had been expressly copied into law.’” (quoting <i>ASTM II</i> , 896 F.3d at 452). | 2-104, 107-121, 123-185                   |
| 2. <u>4 Works</u> : The standard is only partially incorporated so “Defendant’s wholesale reproduction is [] ‘harder to justify.’” (quoting <i>ASTM II</i> , 896 F.3d at 451).  | 1, 105-106, 122                           |

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<sup>3</sup> For each of the 185 Works, the Appendix includes a substantively identical introductory section. *See, e.g.*, Appendix ¶ 1 (“The ‘express text of the law falls plainly outside the realm of copyright protection.’” (quoting *ASTM II*, 896 F.3d at 451)).

## D. Third Factor

| District Court's Analysis   | District Court Appendix Paragraph Nos. |
|---|--|
| <p>1. <u>182 Works</u>: An “incorporating regulation does not specify that only certain provisions [of this standard or its text] are incorporated by reference into law, nor does it indicate which specific provisions of the standard are relevant for regulatory compliance, suggesting that ‘a greater amount of the standard’s text might be fairly reproduced.’” (quoting <i>ASTM II</i>, 896 F.3d at 452).<sup>4</sup></p>  | 2-84, 86-121, 123-185                  |
| <p>2. <u>2 Works</u>: “The incorporating regulation specifies that only specific portions of the standard are incorporated by reference into law, specifically, Test Procedures A, B, and C, which justifies posting the specific text of those provisions. Those test procedures, however, constitute a substantial portion of the standard republished by Defendant. Moreover, copying and republishing the standard’s background sections and appendix ‘are reasonable in relation to the purpose of the copying.’” (quoting <i>Campbell v. Acuff-Rose Music, Inc.</i>, 510 U.S. 569, 586-87 (1994) (citing <i>ASTM II</i>, 896 F.3d at 452)).<sup>5</sup></p> | 85, 122                                |
| <p>3. <u>1 Work</u>: “The incorporating regulation specifies that only specific portions of the standard are incorporated by reference into law. While that incorporation justifies posting the specific text of those provisions—the text of Test Methods A and B—it does not justify posting the entire standard.”</p>  | 1                                      |

<sup>4</sup> For four Works, the district court stated that an incorporating regulation does “not [indicate] which specific provisions of the standard are relevant for regulatory compliance,” but did not include a statement that the regulation did not specify that only certain provisions are incorporated. Appendix ¶¶ 17, 20, 105-106.

<sup>5</sup> For one Work, the district court appended the following to the text quoted above: “given that they relate to the standard’s full text and assist readers with understanding the standard’s legal import.” Appendix ¶ 85.

## E. Fourth Factor

| District Court's Analysis  | District Court Appendix Paragraph Nos. |
|--|--|
| 1. <u>185 Works</u> : “Defendant’s reproductions have not had a ‘substantially adverse impact on the potential market for the originals,’ nor have Plaintiffs shown by a preponderance of the evidence that there is a meaningful likelihood of future harm.”” (quoting Memorandum Opinion 30-36). | 1-185                                  |

## F. Conclusion

| District Court's Analysis   | District Court Appendix Paragraph Nos. |
|---|--|
| 1. <u>183 Works</u> : “Defendant may fairly reproduce” the standard’s text “in its entirety.”         | 2-170, 172-185                         |
| 2. <u>1 Work</u> : “Defendant may fairly reproduce the text of” the standard.                         | 171                                    |
| 3. <u>1 Work</u> : “Defendant may fairly reproduce” certain portions of the standard, but not others. | 1                                      |

## **ADDENDUM**

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|  |        |
|--|--------|
| 5 U.S.C. § 552 (excerpts).....   | ADD-1  |
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| 17 U.S.C. § 502 .....  | ADD-4  |
| Pub. L. No. 104-113, § 12(d)(1), 110 Stat. 775 (1996) (excerpts) ..... | ADD-5  |
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| 46 C.F.R. § 39.1005 (2021).....  | ADD-50 |
| 46 C.F.R. § 39.2009 (2021).....  | ADD-52 |
| 46 C.F.R. § 56.60-2 (1997) .....                                       | ADD-53 |



## HISTORICAL AND REVISION NOTES—CONTINUED

| Derivation     | U.S. Code                 | Revised Statutes and Statutes at Large   |
|----------------|---------------------------|--|
| (2)-(13) ..... | 5 U.S.C. 1001 (less (a)). | Mar. 30, 1948, ch. 161, §301, 62 Stat. 99.<br>June 11, 1946, ch. 324, §2 (less (a)), 60 Stat. 237. |

In paragraph (1), the sentence “Nothing in this Act shall be construed to repeal delegations of authority as provided by law,” is omitted as surplusage since there is nothing in the Act which could reasonably be so construed.

In paragraph (1)(G), the words “or naval” are omitted as included in “military”.

In paragraph (1)(H), the words “functions which by law expire on the termination of present hostilities, within any fixed period thereafter, or before July 1, 1947” are omitted as executed. Reference to the “Selective Training and Service Act of 1940” is omitted as that Act expired Mar. 31, 1947. Reference to the “Sugar Control Extension Act of 1947” is omitted as that Act expired on Mar. 31, 1948. References to the “Housing and Rent Act of 1947, as amended” and the “Veterans’ Emergency Housing Act of 1946” have been consolidated as they are related. The reference to former section 1641(b)(2) of title 50, appendix, is retained notwithstanding its repeal by §111(a)(1) of the Act of Sept. 21, 1961, Pub. L. 87-256, 75 Stat. 538, since §111(c) of the Act provides that a reference in other Acts to a provision of law repealed by §111(a) shall be considered to be a reference to the appropriate provisions of Pub. L. 87-256.

In paragraph (2), the words “of any character” are omitted as surplusage.

In paragraph (3), the words “and a person or agency admitted by an agency as a party for limited purposes” are substituted for “but nothing herein shall be construed to prevent an agency from admitting any person or agency as a party for limited purposes”.

In paragraph (9), a comma is supplied between the words “limitation” and “amendment” to correct an editorial error of omission.

In paragraph (10)(C), the words “of any form” are omitted as surplusage.

Standard changes are made to conform with the definitions applicable and the style of this title as outlined in the preface to the report.

## CODIFICATION

Section 551 of former Title 5, Executive Departments and Government Officers and Employees, was transferred to section 2242 of Title 7, Agriculture.

## AMENDMENTS

2011—Par. (1)(H). Pub. L. 111-350 struck out “chapter 2 of title 41;” after “title 12;”.

1994—Par. (1)(H). Pub. L. 103-272 substituted “subchapter II of chapter 471 of title 49; or sections” for “or sections 1622.”.

1976—Par. (14). Pub. L. 94-409 added par. (14).

## EFFECTIVE DATE OF 1976 AMENDMENT

Amendment by Pub. L. 94-409 effective 180 days after Sept. 13, 1976, see section 6 of Pub. L. 94-409, set out as an Effective Date note under section 552b of this title.

## STUDY AND REPORTS ON ADMINISTRATIVE SUBPOENAS

Pub. L. 106-544, §7, Dec. 19, 2000, 114 Stat. 2719, provided that:

“(a) STUDY ON USE OF ADMINISTRATIVE SUBPOENAS.—Not later than December 31, 2001, the Attorney General, in consultation with the Secretary of the Treasury, shall complete a study on the use of administrative subpoena power by executive branch agencies or entities and shall report the findings to the Committees on the Judiciary of the Senate and the House of Representatives. Such report shall include—

“(1) a description of the sources of administrative subpoena power and the scope of such subpoena power within executive branch agencies;

“(2) a description of applicable subpoena enforcement mechanisms;

“(3) a description of any notification provisions and any other provisions relating to safeguarding privacy interests;

“(4) a description of the standards governing the issuance of administrative subpoenas; and

“(5) recommendations from the Attorney General regarding necessary steps to ensure that administrative subpoena power is used and enforced consistently and fairly by executive branch agencies.

## (b) REPORT ON FREQUENCY OF USE OF ADMINISTRATIVE SUBPOENAS.—

“(1) IN GENERAL.—The Attorney General and the Secretary of the Treasury shall report in January of each year to the Committees on the Judiciary of the Senate and the House of Representatives on the number of administrative subpoenas issued by them under this section and the identity of the agency or component of the Department of Justice or the Department of the Treasury issuing the subpoena and imposing the charges.

“(2) EXPIRATION.—The reporting requirement of this subsection shall terminate in 3 years after the date of the enactment of this section [Dec. 19, 2000].”

## § 552. Public information; agency rules, opinions, orders, records, and proceedings

(a) Each agency shall make available to the public information as follows:

(1) Each agency shall separately state and currently publish in the Federal Register for the guidance of the public—

(A) descriptions of its central and field organization and the established places at which, the employees (and in the case of a uniformed service, the members) from whom, and the methods whereby, the public may obtain information, make submittals or requests, or obtain decisions;

(B) statements of the general course and method by which its functions are channeled and determined, including the nature and requirements of all formal and informal procedures available;

(C) rules of procedure, descriptions of forms available or the places at which forms may be obtained, and instructions as to the scope and contents of all papers, reports, or examinations;

(D) substantive rules of general applicability adopted as authorized by law, and statements of general policy or interpretations of general applicability formulated and adopted by the agency; and

(E) each amendment, revision, or repeal of the foregoing.

Except to the extent that a person has actual and timely notice of the terms thereof, a person may not in any manner be required to resort to, or be adversely affected by, a matter required to be published in the Federal Register and not so published. For the purpose of this paragraph, matter reasonably available to the class of persons affected thereby is deemed published in the Federal Register when incorporated by reference therein with the approval of the Director of the Federal Register.

(2) Each agency, in accordance with published rules, shall make available for public inspection and copying—

(B) to prevent any destruction of a work of recognized stature, and any intentional or grossly negligent destruction of that work is a violation of that right.

(b) SCOPE AND EXERCISE OF RIGHTS.—Only the author of a work of visual art has the rights conferred by subsection (a) in that work, whether or not the author is the copyright owner. The authors of a joint work of visual art are co-owners of the rights conferred by subsection (a) in that work.

(c) EXCEPTIONS.—(1) The modification of a work of visual art which is a result of the passage of time or the inherent nature of the materials is not a destruction, mutilation, or other modification described in subsection (a)(3)(A).

(2) The modification of a work of visual art which is the result of conservation, or of the public presentation, including lighting and placement, of the work is not a destruction, distortion, mutilation, or other modification described in subsection (a)(3) unless the modification is caused by gross negligence.

(3) The rights described in paragraphs (1) and (2) of subsection (a) shall not apply to any reproduction, depiction, portrayal, or other use of a work in, upon, or in any connection with any item described in subparagraph (A) or (B) of the definition of “work of visual art” in section 101, and any such reproduction, depiction, portrayal, or other use of a work is not a destruction, distortion, mutilation, or other modification described in paragraph (3) of subsection (a).

(d) DURATION OF RIGHTS.—(1) With respect to works of visual art created on or after the effective date set forth in section 610(a) of the Visual Artists Rights Act of 1990, the rights conferred by subsection (a) shall endure for a term consisting of the life of the author.

(2) With respect to works of visual art created before the effective date set forth in section 610(a) of the Visual Artists Rights Act of 1990, but title to which has not, as of such effective date, been transferred from the author, the rights conferred by subsection (a) shall be coextensive with, and shall expire at the same time as, the rights conferred by section 106.

(3) In the case of a joint work prepared by two or more authors, the rights conferred by subsection (a) shall endure for a term consisting of the life of the last surviving author.

(4) All terms of the rights conferred by subsection (a) run to the end of the calendar year in which they would otherwise expire.

(e) TRANSFER AND WAIVER.—(1) The rights conferred by subsection (a) may not be transferred, but those rights may be waived if the author expressly agrees to such waiver in a written instrument signed by the author. Such instrument shall specifically identify the work, and uses of that work, to which the waiver applies, and the waiver shall apply only to the work and uses so identified. In the case of a joint work prepared by two or more authors, a waiver of rights under this paragraph made by one such author waives such rights for all such authors.

(2) Ownership of the rights conferred by subsection (a) with respect to a work of visual art is distinct from ownership of any copy of that work, or of a copyright or any exclusive right under a copyright in that work. Transfer of own-

ership of any copy of a work of visual art, or of a copyright or any exclusive right under a copyright, shall not constitute a waiver of the rights conferred by subsection (a). Except as may otherwise be agreed by the author in a written instrument signed by the author, a waiver of the rights conferred by subsection (a) with respect to a work of visual art shall not constitute a transfer of ownership of any copy of that work, or of ownership of a copyright or of any exclusive right under a copyright in that work.

(Added Pub. L. 101-650, title VI, §603(a), Dec. 1, 1990, 104 Stat. 5128.)

#### Editorial Notes

##### REFERENCES IN TEXT

Section 610(a) of the Visual Artists Rights Act of 1990 [Pub. L. 101-650], referred to in subsec. (d), is set out as an Effective Date note below.

#### Statutory Notes and Related Subsidiaries

##### EFFECTIVE DATE

Pub. L. 101-650, title VI, §610, Dec. 1, 1990, 104 Stat. 5132, provided that:

“(a) IN GENERAL.—Subject to subsection (b) and except as provided in subsection (c), this title [enacting this section, amending sections 101, 107, 113, 301, 411, 412, 501, and 506 of this title, and enacting provisions set out as notes under this section and section 101 of this title] and the amendments made by this title take effect 6 months after the date of the enactment of this Act [Dec. 1, 1990].

“(b) APPLICABILITY.—The rights created by section 106A of title 17, United States Code, shall apply to—

“(1) works created before the effective date set forth in subsection (a) but title to which has not, as of such effective date, been transferred from the author, and

“(2) works created on or after such effective date, but shall not apply to any destruction, distortion, mutilation, or other modification (as described in section 106A(a)(3) of such title) of any work which occurred before such effective date.

“(c) SECTION 608.—Section 608 [set out below] takes effect on the date of the enactment of this Act.”

##### STUDIES BY COPYRIGHT OFFICE

Pub. L. 101-650, title VI, §608, Dec. 1, 1990, 104 Stat. 5132, directed the Register of Copyrights to study the extent to which authorship rights have been waived by visual artists under this section and to submit a final report to Congress not later than 5 years after Dec. 1, 1990, and also directed the Register of Copyrights to study the feasibility of implementing a requirement that, after the first sale of a work of art, would enable authors of visual art to share monetarily in the resale and enhanced value of that work, with a report to Congress due not later than 18 months after Dec. 1, 1990.

#### § 107. Limitations on exclusive rights: Fair use

Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include—

(1) the purpose and character of the use, including whether such use is of a commercial

nature or is for nonprofit educational purposes;

(2) the nature of the copyrighted work;

(3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and

(4) the effect of the use upon the potential market for or value of the copyrighted work.

The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors.

(Pub. L. 94-553, title I, § 101, Oct. 19, 1976, 90 Stat. 2546; Pub. L. 101-650, title VI, § 607, Dec. 1, 1990, 104 Stat. 5132; Pub. L. 102-492, Oct. 24, 1992, 106 Stat. 3145.)

#### HISTORICAL AND REVISION NOTES

HOUSE REPORT NO. 94-1476

**General Background of the Problem.** The judicial doctrine of fair use, one of the most important and well-established limitations on the exclusive right of copyright owners, would be given express statutory recognition for the first time in section 107. The claim that a defendant's acts constituted a fair use rather than an infringement has been raised as a defense in innumerable copyright actions over the years, and there is ample case law recognizing the existence of the doctrine and applying it. The examples enumerated at page 24 of the Register's 1961 Report, while by no means exhaustive, give some idea of the sort of activities the courts might regard as fair use under the circumstances: "quotation of excerpts in a review or criticism for purposes of illustration or comment; quotation of short passages in a scholarly or technical work, for illustration or clarification of the author's observations; use in a parody of some of the content of the work parodied; summary of an address or article, with brief quotations, in a news report; reproduction by a library of a portion of a work to replace part of a damaged copy; reproduction by a teacher or student of a small part of a work to illustrate a lesson; reproduction of a work in legislative or judicial proceedings or reports; incidental and fortuitous reproduction, in a newsreel or broadcast, of a work located in the scene of an event being reported."

Although the courts have considered and ruled upon the fair use doctrine over and over again, no real definition of the concept has ever emerged. Indeed, since the doctrine is an equitable rule of reason, no generally applicable definition is possible, and each case raising the question must be decided on its own facts. On the other hand, the courts have evolved a set of criteria which, though in no case definitive or determinative, provide some gauge for balancing the equities. These criteria have been stated in various ways, but essentially they can all be reduced to the four standards which have been adopted in section 107: "(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work."

These criteria are relevant in determining whether the basic doctrine of fair use, as stated in the first sentence of section 107, applies in a particular case: "Notwithstanding the provisions of section 106, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright."

The specific wording of section 107 as it now stands is the result of a process of accretion, resulting from the

long controversy over the related problems of fair use and the reproduction (mostly by photocopying) of copyrighted material for educational and scholarly purposes. For example, the reference to fair use "by reproduction in copies or phonorecords or by any other means" is mainly intended to make clear that the doctrine has as much application to photocopying and taping as to older forms of use; it is not intended to give these kinds of reproduction any special status under the fair use provision or to sanction any reproduction beyond the normal and reasonable limits of fair use. Similarly, the newly-added reference to "multiple copies for classroom use" is a recognition that, under the proper circumstances of fairness, the doctrine can be applied to reproductions of multiple copies for the members of a class.

The Committee has amended the first of the criteria to be considered—"the purpose and character of the use"—to state explicitly that this factor includes a consideration of "whether such use is of a commercial nature or is for non-profit educational purposes." This amendment is not intended to be interpreted as any sort of not-for-profit limitation on educational uses of copyrighted works. It is an express recognition that, as under the present law, the commercial or non-profit character of an activity, while not conclusive with respect to fair use, can and should be weighed along with other factors in fair use decisions.

**General Intention Behind the Provision.** The statement of the fair use doctrine in section 107 offers some guidance to users in determining when the principles of the doctrine apply. However, the endless variety of situations and combinations of circumstances that can rise in particular cases precludes the formulation of exact rules in the statute. The bill endorses the purpose and general scope of the judicial doctrine of fair use, but there is no disposition to freeze the doctrine in the statute, especially during a period of rapid technological change. Beyond a very broad statutory explanation of what fair use is and some of the criteria applicable to it, the courts must be free to adapt the doctrine to particular situations on a case-by-case basis. Section 107 is intended to restate the present judicial doctrine of fair use, not to change, narrow, or enlarge it in any way.

**Intention as to Classroom Reproduction.** Although the works and uses to which the doctrine of fair use is applicable are as broad as the copyright law itself, most of the discussion of section 107 has centered around questions of classroom reproduction, particularly photocopying. The arguments on the question are summarized at pp. 30-31 of this Committee's 1967 report (H.R. Rep. No. 83, 90th Cong., 1st Sess.), and have not changed materially in the intervening years.

The Committee also adheres to its earlier conclusion, that "a specific exemption freeing certain reproductions of copyrighted works for educational and scholarly purposes from copyright control is not justified." At the same time the Committee recognizes, as it did in 1967, that there is a "need for greater certainty and protection for teachers." In an effort to meet this need the Committee has not only adopted further amendments to section 107, but has also amended section 504(c) to provide innocent teachers and other non-profit users of copyrighted material with broad insulation against unwarranted liability for infringement. The latter amendments are discussed below in connection with Chapter 5 of the bill [§ 501 et seq. of this title].

In 1967 the Committee also sought to approach this problem by including, in its report, a very thorough discussion of "the considerations lying behind the four criteria listed in the amended section 107, in the context of typical classroom situations arising today." This discussion appeared on pp. 32-35 of the 1967 report, and with some changes has been retained in the Senate report on S. 22 (S. Rep. No. 94-473, pp. 63-65). The Committee has reviewed this discussion, and considers that it still has value as an analysis of various aspects of the problem.

At the Judiciary Subcommittee hearings in June 1975, Chairman Kastenmeier and other members urged

**§ 502****TITLE 17—COPYRIGHTS**

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**CAUSES OF ACTION ARISING UNDER PREDECESSOR PROVISIONS**

Pub. L. 94-553, title I, §112, Oct. 19, 1976, 90 Stat. 2600, provided that: "All causes of action that arose under title 17 before January 1, 1978, shall be governed by title 17 as it existed when the cause of action arose."

**§ 502. Remedies for infringement: Injunctions**

(a) Any court having jurisdiction of a civil action arising under this title may, subject to the provisions of section 1498 of title 28, grant temporary and final injunctions on such terms as it may deem reasonable to prevent or restrain infringement of a copyright.

(b) Any such injunction may be served anywhere in the United States on the person enjoined; it shall be operative throughout the United States and shall be enforceable, by proceedings in contempt or otherwise, by any United States court having jurisdiction of that person. The clerk of the court granting the injunction shall, when requested by any other court in which enforcement of the injunction is sought, transmit promptly to the other court a certified copy of all the papers in the case on file in such clerk's office.

(Pub. L. 94-553, title I, §101, Oct. 19, 1976, 90 Stat. 2584.)

**HISTORICAL AND REVISION NOTES****HOUSE REPORT NO. 94-1476**

Section 502(a) [subsec. (a) of this section] reasserts the discretionary power of courts to grant injunctions and restraining orders, whether "preliminary," "temporary," "interlocutory," "permanent," or "final," to prevent or stop infringements of copyright. This power is made subject to the provisions of section 1498 of title 28 dealing with infringement actions against the United States. The latter reference in section 502(a) makes it clear that the bill would not permit the granting of an injunction against an infringement for which the Federal Government is liable under section 1498.

Under subsection (b), which is the counterpart of provisions in sections 112 and 113 of the present statute [sections 112 and 113 of former title 17], a copyright owner who has obtained an injunction in one State will be able to enforce it against a defendant located anywhere else in the United States.

**§ 503. Remedies for infringement: Impounding and disposition of infringing articles**

(a)(1) At any time while an action under this title is pending, the court may order the impounding, on such terms as it may deem reasonable—

(A) of all copies or phonorecords claimed to have been made or used in violation of the exclusive right of the copyright owner;

(B) of all plates, molds, matrices, masters, tapes, film negatives, or other articles by means of which such copies or phonorecords may be reproduced; and

(C) of records documenting the manufacture, sale, or receipt of things involved in any such violation, provided that any records seized under this subparagraph shall be taken into the custody of the court.

(2) For impoundments of records ordered under paragraph (1)(C), the court shall enter an appropriate protective order with respect to discovery and use of any records or information that has

been impounded. The protective order shall provide for appropriate procedures to ensure that confidential, private, proprietary, or privileged information contained in such records is not improperly disclosed or used.

(3) The relevant provisions of paragraphs (2) through (11) of section 34(d) of the Trademark Act (15 U.S.C. 1116(d)(2) through (11)) shall extend to any impoundment of records ordered under paragraph (1)(C) that is based upon an ex parte application, notwithstanding the provisions of rule 65 of the Federal Rules of Civil Procedure. Any references in paragraphs (2) through (11) of section 34(d) of the Trademark Act to section 32 of such Act shall be read as references to section 501 of this title, and references to use of a counterfeit mark in connection with the sale, offering for sale, or distribution of goods or services shall be read as references to infringement of a copyright.

(b) As part of a final judgment or decree, the court may order the destruction or other reasonable disposition of all copies or phonorecords found to have been made or used in violation of the copyright owner's exclusive rights, and of all plates, molds, matrices, masters, tapes, film negatives, or other articles by means of which such copies or phonorecords may be reproduced.

(Pub. L. 94-553, title I, §101, Oct. 19, 1976, 90 Stat. 2585; Pub. L. 110-403, title I, §102(a), Oct. 13, 2008, 122 Stat. 4258; Pub. L. 111-295, §6(d), Dec. 9, 2010, 124 Stat. 3181.)

**HISTORICAL AND REVISION NOTES****HOUSE REPORT NO. 94-1476**

The two subsections of section 503 deal respectively with the courts' power to impound allegedly infringing articles during the time an action is pending, and to order the destruction or other disposition of articles found to be infringing. In both cases the articles affected include "all copies or phonorecords" which are claimed or found "to have been made or used in violation of the copyright owner's exclusive rights," and also "all plates, molds, matrices, masters, tapes, film negatives, or other articles by means of which such copies or phonorecords may be reproduced." The alternative phrase "made or used" in both subsections enables a court to deal as it sees fit with articles which, though reproduced and acquired lawfully, have been used for infringing purposes such as rentals, performances, and displays.

Articles may be impounded under subsection (a) "at any time while an action under this title is pending," thus permitting seizures of articles alleged to be infringing as soon as suit has been filed and without waiting for an injunction. The same subsection empowers the court to order impounding "on such terms as it may deem reasonable." The present Supreme Court rules with respect to seizure and impounding were issued even though there is no specific provision authorizing them in the copyright statute, and there appears no need for including a special provision on the point in the bill.

Under section 101(d) of the present statute [section 101(d) of former title 17], articles found to be infringing may be ordered to be delivered up for destruction. Section 503(b) of the bill would make this provision more flexible by giving the court discretion to order "destruction or other reasonable disposition" of the articles found to be infringing. Thus, as part of its final judgment or decree, the court could order the infringing articles sold, delivered to the plaintiff, or disposed of in some other way that would avoid needless waste and best serve the ends of justice.

## PUBLIC LAW 104-113—MAR. 7, 1996

110 STAT. 775

Public Law 104-113  
104th Congress

## An Act

To amend the Stevenson-Wydler Technology Innovation Act of 1980 with respect to inventions made under cooperative research and development agreements, and for other purposes.

Mar. 7, 1996  
[H.R. 2196]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the “National Technology Transfer and Advancement Act of 1995”.

**SEC. 2. FINDINGS.**

The Congress finds the following:

(1) Bringing technology and industrial innovation to the marketplace is central to the economic, environmental, and social well-being of the people of the United States.

(2) The Federal Government can help United States business to speed the development of new products and processes by entering into cooperative research and development agreements which make available the assistance of Federal laboratories to the private sector, but the commercialization of technology and industrial innovation in the United States depends upon actions by business.

(3) The commercialization of technology and industrial innovation in the United States will be enhanced if companies, in return for reasonable compensation to the Federal Government, can more easily obtain exclusive licenses to inventions which develop as a result of cooperative research with scientists employed by Federal laboratories.

**SEC. 3. USE OF FEDERAL TECHNOLOGY.**

Subparagraph (B) of section 11(e)(7) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710(e)(7)(B)) is amended to read as follows:

“(B) A transfer shall be made by any Federal agency under subparagraph (A), for any fiscal year, only if the amount so transferred by that agency (as determined under such subparagraph) would exceed \$10,000.”.

**SEC. 4. TITLE TO INTELLECTUAL PROPERTY ARISING FROM COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS.**

Subsection (b) of section 12 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a(b)) is amended to read as follows:

“(b) ENUMERATED AUTHORITY.—(1) Under an agreement entered into pursuant to subsection (a)(1), the laboratory may grant, or

National  
Technology  
Transfer and  
Advancement Act  
of 1995.  
15 USC 3701  
note.  
15 USC 3701  
note.

fasteners from two lots shall be conspicuously marked with the lot identification numbers of both lots.

“(f) SUBSEQUENT PURCHASER.—If a person who purchases fasteners for any purpose so requests either prior to the sale or at the time of sale, the seller shall conspicuously mark the container of the fasteners with the lot number from which such fasteners were taken.”.

“(g) SECTION 9 AMENDMENT.—Section 9 of the Fastener Quality Act (15 U.S.C. 5408) is amended by adding at the end the following new subsection:

“(d) ENFORCEMENT.—The Secretary may designate officers or employees of the Department of Commerce to conduct investigations pursuant to this Act. In conducting such investigations, those officers or employees may, to the extent necessary or appropriate to the enforcement of this Act, exercise such authorities as are conferred upon them by other laws of the United States, subject to policies and procedures approved by the Attorney General.”.

“(h) SECTION 10 AMENDMENTS.—Section 10 of the Fastener Quality Act (15 U.S.C. 5409) is amended—

“(1) in subsections (a) and (b), by striking “10 years” and inserting in lieu thereof “5 years”; and

“(2) in subsection (b), by striking “any subsequent” and inserting in lieu thereof “the subsequent”.

“(i) SECTION 13 AMENDMENT.—Section 13 of the Fastener Quality Act (15 U.S.C. 5412) is amended by striking “within 180 days after the date of enactment of this Act”.

“(j) SECTION 14 REPEAL.—Section 14 of the Fastener Quality Act (15 U.S.C. 5413) is repealed.

#### SEC. 12. STANDARDS CONFORMITY.

“(a) USE OF STANDARDS.—Section 2(b) of the National Institute of Standards and Technology Act (15 U.S.C. 272(b)) is amended—

“(1) in paragraph (2), by striking “, including comparing standards” and all that follows through “Federal Government”;

“(2) by redesignating paragraphs (3) through (11) as paragraphs (4) through (12), respectively; and

“(3) by inserting after paragraph (2) the following new paragraph:

“(3) to compare standards used in scientific investigations, engineering, manufacturing, commerce, industry, and educational institutions with the standards adopted or recognized by the Federal Government and to coordinate the use by Federal agencies of private sector standards, emphasizing where possible the use of standards developed by private, consensus organizations;”.

“(b) CONFORMITY ASSESSMENT ACTIVITIES.—Section 2(b) of the National Institute of Standards and Technology Act (15 U.S.C. 272(b)) is amended—

“(1) by striking “and” at the end of paragraph (11), as so redesignated by subsection (a)(2) of this section;

“(2) by striking the period at the end of paragraph (12), as so redesignated by subsection (a)(2) of this section, and inserting in lieu thereof “; and”; and

“(3) by adding at the end the following new paragraph:

“(13) to coordinate Federal, State, and local technical standards activities and conformity assessment activities, with private sector technical standards activities and conformity assess-

## PUBLIC LAW 104-113—MAR. 7, 1996

110 STAT. 783

ment activities, with the goal of eliminating unnecessary duplication and complexity in the development and promulgation of conformity assessment requirements and measures.”

(c) TRANSMITTAL OF PLAN TO CONGRESS.—The National Institute of Standards and Technology shall, within 90 days after the date of enactment of this Act, transmit to the Congress a plan for implementing the amendments made by this section.

15 USC 272 note.

(d) UTILIZATION OF CONSENSUS TECHNICAL STANDARDS BY FEDERAL AGENCIES; REPORTS.—

15 USC 272 note.

(1) IN GENERAL.—Except as provided in paragraph (3) of this subsection, all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.

(2) CONSULTATION; PARTICIPATION.—In carrying out paragraph (1) of this subsection, Federal agencies and departments shall consult with voluntary, private sector, consensus standards bodies and shall, when such participation is in the public interest and is compatible with agency and departmental missions, authorities, priorities, and budget resources, participate with such bodies in the development of technical standards.

(3) EXCEPTION.—If compliance with paragraph (1) of this subsection is inconsistent with applicable law or otherwise impractical, a Federal agency or department may elect to use technical standards that are not developed or adopted by voluntary consensus standards bodies if the head of each such agency or department transmits to the Office of Management and Budget an explanation of the reasons for using such standards. Each year, beginning with fiscal year 1997, the Office of Management and Budget shall transmit to Congress and its committees a report summarizing all explanations received in the preceding year under this paragraph.

(4) DEFINITION OF TECHNICAL STANDARDS.—As used in this subsection, the term “technical standards” means performance-based or design-specific technical specifications and related management systems practices.

**SEC. 13. SENSE OF CONGRESS.**

It is the sense of the Congress that the Malcolm Baldrige National Quality Award program offers substantial benefits to

## Coast Guard, DOT

## Pt. 154, App. C

## ATTACHMENT 1

| Inflammable gas or vapor                        | Experimental maximum safe gap |        |
|---|-------------------------------|--------|
|   | mm                            | in.    |
| Methane .....                                   | 1.170                         | 0.046  |
| Blast furnace gas .....                         | 1.193                         | 0.047  |
| Propane .....                                   | 0.965                         | 0.038  |
| Butane .....                                    | 1.066                         | 0.042  |
| Pentane .....                                   | 1.016                         | 0.040  |
| Hexane .....                                    | 0.965                         | 0.038  |
| Heptane .....                                   | 0.965                         | 0.038  |
| Iso-octane .....                                | 1.040                         | 0.041  |
| Decane .....                                    | 1.016                         | 0.040  |
| Benzene .....                                   | 0.99                          | 0.039  |
| Xylene .....                                    | 1.066                         | 0.042  |
| Cyclohexane .....                               | 0.94                          | 0.037  |
| Acetone .....                                   | 1.016                         | 0.040  |
| Ethylene .....                                  | 0.71                          | 0.028  |
| Methyl-ethyl-ketone .....                       | 1.016                         | 0.040  |
| Carbon monoxide .....                           | 0.915                         | 0.036  |
| Methyl-acetate .....                            | 0.990                         | 0.039  |
| Ethyl-acetate .....                             | 1.04                          | 0.041  |
| Propyl-acetate .....                            | 1.04                          | 0.041  |
| Butyl-acetate .....                             | 1.016                         | 0.040  |
| Amyl-acetate .....                              | 0.99                          | 0.039  |
| Methyl alcohol .....                            | 0.915                         | 0.036  |
| Ethyl alcohol .....                             | 1.016                         | 0.040  |
| Iso-butyl-alcohol .....                         | 0.965                         | 0.038  |
| Butyl-alcohol (Normal) .....                    | 0.94                          | 0.037  |
| Amyl-alcohol .....                              | 0.99                          | 0.039  |
| Ethyl-ether .....                               | 0.864                         | 0.034  |
| Coal gas (H <sub>2</sub> 57%) .....             | 0.482                         | 0.019  |
| Acetylene .....                                 | <0.25                         | <0.001 |
| Carbon disulphide .....                         | 0.203                         | 0.008  |
| Hydrogen .....                                  | 0.102                         | 0.004  |
| Blu water gas (H <sub>2</sub> 53% CO 47%) ..... | 0.203                         | 0.008  |
| Ethyl nitrate .....                             | <0.025                        | <0.001 |
| Ammonia .....                                   | 13.33                         | 10.133 |
| Ethylene oxide .....                            | 0.65                          | 0.026  |
| Ethyl nitrite .....                             | 0.922                         | 0.038  |

<sup>1</sup>Approximately.

[CGD 88-102, 55 FR 25441, June 21, 1990, as amended by USCG-1999-5832, 64 FR 34715, June 29, 1999]

**APPENDIX C TO PART 154—GUIDELINES FOR DETERMINING AND EVALUATING REQUIRED RESPONSE RESOURCES FOR FACILITY RESPONSE PLANS**

*1. Purpose*

1.1 The purpose of this appendix is to describe the procedures for identifying response resources to meet the requirements of subpart F of this part. These guidelines will be used by the facility owner or operator in preparing the response plan and by the Captain of the Port (COTP) when reviewing them. Response resources identified in subparts H and I of this part should be selected using the guidelines in section 2 and Table 1 of this appendix.

*2. Equipment Operability and Readiness*

2.1 All equipment identified in a response plan must be designed to operate in the conditions expected in the facility's geographic

area. These conditions vary widely based on location and season. Therefore, it is difficult to identify a single stockpile of response equipment that will function effectively in each geographic location.

2.2 Facilities handling, storing, or transporting oil in more than one operating environment as indicated in Table 1 of this appendix must identify equipment capable of successfully functioning in each operating environment.

2.3 When identifying equipment for response plan credit, a facility owner or operator must consider the inherent limitations in the operability of equipment components and response systems. The criteria in Table 1 of this appendix should be used for evaluating the operability in a given environment. These criteria reflect the general conditions in certain operating areas.

2.3.1 The Coast Guard may require documentation that the boom identified in a response plan meets the criteria in Table 1. Absent acceptable documentation, the Coast Guard may require that the boom be tested to demonstrate that it meets the criteria in Table 1. Testing must be in accordance with ASTM F 715, ASTM F 989, or other tests approved by the Coast Guard.

2.4 Table 1 of this appendix lists criteria for oil recovery devices and boom. All other equipment necessary to sustain or support response operations in the specified operating environment must be designed to function in the same conditions. For example, boats which deploy or support skimmers or boom must be capable of being safely operated in the significant wave heights listed for the applicable operating environment.

2.5 A facility owner or operator must refer to the applicable local contingency plan or ACP, as appropriate, to determine if ice, debris, and weather-related visibility are significant factors in evaluating the operability of equipment. The local contingency plan or ACP will also identify the average temperature ranges expected in the facility's operating area. All equipment identified in a response plan must be designed to operate within those conditions or ranges.

2.6 The requirements of subparts F, G, H and I of this part establish response resource mobilization and response times. The distance of the facility from the storage location of the response resources must be used to determine whether the resources can arrive on scene within the stated time. A facility owner or operator shall include the time for notification, mobilization, and travel time of response resources identified to meet the maximum most probable discharge and Tier 1 worst case discharge response time requirements. For subparts F and G, tier 2 and 3 response resources must be notified and mobilized as necessary to meet the requirements for arrival on scene in accordance with §§154.1045 or 154.1047 of subpart F, or

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§154.1135 of subpart G, as appropriate. An on water speed of 5 knots and a land speed of 35 miles per hour is assumed unless the facility owner or operator can demonstrate otherwise.

2.7 For subparts F and G, in identifying equipment, the facility owner or operator shall list the storage location, quantity, and manufacturer's make and model. For oil recovery devices, the effective daily recovery capacity, as determined using section 6 of this appendix must be included. For boom, the overall boom height (draft plus freeboard) should be included. A facility owner or operator is responsible for ensuring that identified boom has compatible connectors.

2.8 For subparts H and I, in identifying equipment, the facility owner or operator shall list the storage location, quantity, and manufacturer's make and model. For boom, the overall boom height (draft plus freeboard) should be included. A facility owner or operator is responsible for ensuring that identified boom has compatible connectors.

**3. Determining Response Resources Required for the Average Most Probable Discharge**

3.1 A facility owner or operator shall identify sufficient response resources available, through contract or other approved means as described in §154.1028(a), to respond to the average most probable discharge. The equipment must be designed to function in the operating environment at the point of expected use.

3.2 The response resources must include:

3.2.1 1,000 feet of containment boom or two times the length of the largest vessel that regularly conducts oil transfers to or from the facility, whichever is greater, and a means deploying it available at the spill site within 1 hour of the discovery of a spill.

3.2.2 Oil recovery devices with an effective daily recovery capacity equal to the amount of oil discharged in an average most probable discharge or greater available at the facility within 2 hours of the detection of an oil discharge.

3.2.3 Oil storage capacity for recovered oily material indicated in section 9.2 of this appendix.

**4. Determining Response Resources Required for the Maximum Most Probable Discharge**

4.1 A facility owner or operator shall identify sufficient response resources available, by contract or other approved means as described in §154.1028(a), to respond to discharges up to the maximum most probable discharge volume for that facility. This will require response resources capable of containing and collecting up to 1,200 barrels of oil or 10 percent of the worst case discharge, whichever is less. All equipment identified

must be designed to operate in the applicable operating environment specified in Table 1 of this appendix.

4.2 Oil recovery devices identified to meet the applicable maximum most probable discharge volume planning criteria must be located such that they arrive on scene within 6 hours in higher volume port areas (as defined in 154.1020) and the Great Lakes and within 12 hours in all other areas.

4.3 Because rapid control, containment, and removal of oil is critical to reduce spill impact, the effective daily recovery capacity for oil recovery devices must equal 50 percent of the planning volume applicable for the facility as determined in section 4.1 of this appendix. The effective daily recovery capacity for oil recovery devices identified in the plan must be determined using the criteria in section 6 of this appendix.

4.4 In addition to oil recovery capacity, the plan must identify sufficient quantities of containment boom available, by contract or other approved means as described in §154.1028(a), to arrive within the required response times for oil collection and containment and for protection of fish and wildlife and sensitive environments. While the regulation does not set required quantities of boom for oil collection and containment, the response plan must identify and ensure, by contract or other approved means as described in §154.1028(a), the availability of the boom identified in the plan for this purpose.

4.5 The plan must indicate the availability of temporary storage capacity to meet the guidelines of section 9.2 of this appendix. If available storage capacity is insufficient to meet this level, then the effective daily recovery capacity must be derated to the limits of the available storage capacity.

4.6 The following is an example of a maximum most probable discharge volume planning calculation for equipment identification in a higher volume port area: The facility's worst case discharge volume is 20,000 barrels. Ten percent of this is 2,000 barrels. Since this is greater than 1,200 barrels, 1,200 barrels is used as the planning volume. The effective daily recovery capacity must be 50 percent of this, or 600 barrels per day. The ability of oil recovery devices to meet this capacity will be calculated using the procedures in section 6 of this appendix. Temporary storage capacity available on scene must equal twice the daily recovery rate as indicated in section 9 of this appendix, or 1,200 barrels per day. This is the information the facility owner or operator will use to identify and ensure the availability of, through contract or other approved means as described in §154.1028(a), the required response resources. The facility owner will also need to identify how much boom is available for use.

**Coast Guard, DOT****Pt. 154, App. C****5. Determining Response Resources Required for the Worst Case Discharge to the Maximum Extent Practicable**

5.1 A facility owner or operator shall identify and ensure availability of, by contract or other approved means, as described in §154.1028(a), sufficient response resources to respond to the worst case discharge of oil to the maximum extent practicable. Section 7 of this appendix describes the method to determine the required response resources.

5.2 Oil spill response resources identified in the response plan and available through contract or other approved means, as described in §154.1028(a), to meet the applicable worst case discharge planning volume must be located such that they can arrive at the scene of a discharge within the times specified for the applicable response tiers listed in §154.1045.

5.3 The effective daily recovery capacity for oil recovery devices identified in a response plan must be determined using the criteria in section 6 of this appendix. A facility owner or operator shall identify the storage locations of all response resources that must be used to fulfill the requirements for each tier. The owner or operator of a facility whose required daily recovery capacity exceeds the applicable response capability caps in Table 5 of this appendix shall identify sources of additional equipment, their locations, and the arrangements made to obtain this equipment during a response. The owner or operator of a facility whose calculated planning volume exceeds the applicable contracting caps in Table 5 shall identify sources of additional equipment equal to twice the cap listed in Tiers 1, 2, and 3 or the amount necessary to reach the calculated planning volume, whichever is lower. The resources identified above the cap must be capable of arriving on scene not later than the Tiers 1, 2, and 3 response times in §154.1045. No contract is required. While general listings of available response equipment may be used to identify additional sources, a response plan must identify the specific sources, locations, and quantities of equipment that a facility owner or operator has considered in his or her planning. When listing Coast Guard classified oil spill removal organization(s) which have sufficient removal capacity to recover the volume above the response capability cap for the specific facility, as specified in Table 5 of this appendix, it is not necessary to list specific quantities of equipment.

5.4 A facility owner or operator shall identify the availability of temporary storage capacity to meet the requirements of section 9.2 of this appendix. If available storage capacity is insufficient to meet this requirement, then the effective daily recovery capacity must be derated to the limits of the available storage capacity.

5.5 When selecting response resources necessary to meet the response plan requirements, the facility owner or operator must ensure that a portion of those resources are capable of being used in close-to-shore response activities in shallow water. The following percentages of the on-water response equipment identified for the applicable geographic area must be capable of operating in waters of 6 feet or less depth:

- (i) Offshore—10 percent
- (ii) Nearshore/inland/Great Lakes/rivers and canals—20 percent.

5.6 In addition to oil spill recovery devices, a facility owner or operator shall identify sufficient quantities of boom that are available, by contract or other approved means as described in §154.1028(a), to arrive on scene within the required response times for oil containment and collection. The specific quantity of boom required for collection and containment will depend on the specific recovery equipment and strategies employed. A facility owner or operator shall also identify sufficient quantities of oil containment boom to protect fish and wildlife and sensitive environments for the number of days and geographic areas specified in Table 2. Sections 154.1035(b)(4)(iii) and 154.1040(a), as appropriate, shall be used to determine the amount of containment boom required, through contract or other approved means as described in §154.1028(a), to protect fish and wildlife and sensitive environments.

5.7 A facility owner or operator must also identify, through contract or other approved means as described in §154.1028(a), the availability of an oil spill removal organization capable of responding to a shoreline cleanup operation involving the calculated volume of oil and emulsified oil that might impact the affected shoreline. The volume of oil that must be planned for is calculated through the application of factors contained in Tables 2 and 3. The volume calculated from these tables is intended to assist the facility owner or operator in identifying a contractor with sufficient resources and expertise. This planning volume is not used explicitly to determine a required amount of equipment and personnel.

**6. Determining Effective Daily Recovery Capacity for Oil Recovery Devices**

6.1 Oil recovery devices identified by a facility owner or operator must be identified by manufacturer, model, and effective daily recovery capacity. These rates must be used to determine whether there is sufficient capacity to meet the applicable planning criteria for the average most probable discharge, maximum most probable discharge, and worst case discharge to the maximum extent practicable.

6.2 For the purpose of determining the effective daily recovery capacity of oil recovery devices, the formula listed in section

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6.2.1 of this appendix will be used. This method considers potential limitations due to available daylight, weather, sea state, and percentage of emulsified oil in the recovered material. The Coast Guard may assign a lower efficiency factor to equipment listed in a response plan if it determines that such a reduction is warranted.

6.2.1 The following formula must be used to calculate the effective daily recovery capacity:

$$R = Tx24 \text{ hours} \times E$$

R=Effective daily recovery capacity

T=Throughout rate in barrels per hour  
(nameplate capacity)

E=20 percent Efficiency factor (or lower factor as determined by Coast Guard)

6.2.2 For those devices in which the pump limits the throughput of liquid, throughput rate will be calculated using the pump capacity.

6.2.3 For belt or mop type devices, the throughput rate will be calculated using the speed of the belt or mop through the device, assumed thickness of oil adhering to or collected by the device, and surface area of the belt or mop. For purposes of this calculation, the assumed thickness of oil will be 1/4 inch.

6.2.4 Facility owners or operators including oil recovery devices whose throughput is not measurable using a pump capacity or belt/mop speed may provide information to support an alternative method of calculation. This information must be submitted following the procedures in paragraph 6.3.2 of this appendix.

6.3 As an alternative to 6.2, a facility owner or operator may submit adequate evidence that a different effective daily recovery capacity should be applied for a specific oil recovery device. Adequate evidence is actual verified performance data in spill conditions or tests using ASTM F 631, ASTM F 808, or an equivalent test approved by the Coast Guard.

6.3.1 The following formula must be used to calculate the effective daily recovery capacity under this alternative:

$$R = DxU$$

R=Effective daily recovery capacity

D=Average Oil Recovery Rate in barrels per hour (Item 26 in ASTM F 808; Item 13.1.15 in ASTM F 631; or actual performance data)

U=Hours per day that a facility owner or operator can document capability to operate equipment under spill conditions. Ten hours per day must be used unless a facility owner or operator can demonstrate that the recovery operation can be sustained for longer periods.

6.3.2 A facility owner or operator proposing a different effective daily recovery rate for use in a response plan shall provide data for the oil recovery devices listed. The

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following is an example of these calculations:

A weir skimmer identified in a response plan has a manufacturer's rated throughput at the pump of 267 gallons per minute (gpm).

$$267 \text{ gpm} = 381 \text{ barrels per hour}$$

$$R = 381 \times 24 \times .2 = 1829 \text{ barrels per day}$$

After testing using ASTM procedures, the skimmer's oil recovery rate is determined to be 220 gpm. The facility owner or operator identifies sufficient response resources available to support operations 12 hours per day.

$$220 \text{ gpm} = 314 \text{ barrels per hour}$$

$$R = 314 \times 12 = 3768 \text{ barrels per day}$$

The facility owner or operator will be able to use the higher rate if sufficient temporary oil storage capacity is available. Determinations of alternative efficiency factors under paragraph 6.2 or alternative effective daily recovery capacities under paragraph 6.3 of this appendix will be made by Commandant, (G-MOR), Coast Guard Headquarters, 2100 Second Street SW., Washington, DC 20593. Response contractors or equipment manufacturers may submit required information on behalf of multiple facility owners or operators directly in lieu of including the request with the response plan submission.

*7. Calculating the Worst Case Discharge Planning Volumes*

7.1 The facility owner or operator shall plan for a response to a facility's worst case discharge. The planning for on-water recovery must take into account a loss of some oil to the environment due to evaporative and natural dissipation, potential increases in volume due to emulsification, and the potential for deposit of some oil on the shoreline.

7.2 The following procedures must be used to calculate the planning volume used by a facility owner or operator for determining required on water recovery capacity:

7.2.1 The following must be determined: The worst case discharge volume of oil in the facility; the appropriate group(s) for the type of oil handled, stored, or transported at the facility (non-persistent (Group I) or persistent (Groups II, III, or IV)); and the facility's specific operating area. Facilities which handle, store, or transport oil from different petroleum oil groups must calculate each group separately. This information is to be used with Table 2 of this appendix to determine the percentages of the total volume to be used for removal capacity planning. This table divides the volume into three categories: Oil lost to the environment; oil deposited on the shoreline; and oil available for on-water recovery.

7.2.2 The on-water oil recovery volume must be adjusted using the appropriate emulsification factor found in Table 3 of this appendix. Facilities which handle, store, or transport oil from different petroleum

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groups must assume that the oil group resulting in the largest on-water recovery volume will be stored in the tank or tanks identified as constituting the worst case discharge.

7.2.3 The adjusted volume is multiplied by the on-water oil recovery resource mobilization factor found in Table 4 of this appendix from the appropriate operating area and response tier to determine the total on-water oil recovery capacity in barrels per day that must be identified or contracted for to arrive on-scene with the applicable time for each response tier. Three tiers are specified. For higher volume port areas, the contracted tiers of resources must be located such that they can arrive on scene within 6, 30, and 54 hours of the discovery of an oil discharge. For all other river, inland, nearshore, offshore areas, and the Great Lakes, these tiers are 12, 36, and 60 hours.

7.2.4 The resulting on-water recovery capacity in barrels per day for each tier must be used to identify response resources necessary to sustain operations in the applicable operating area. The equipment must be capable of sustaining operations for the time period specified in Table 2 of this appendix. The facility owner or operator must identify and ensure the availability, through contract or other approved means as described in §154.1028(a), of sufficient oil spill recovery devices to provide the effective daily recovery oil recovery capacity required. If the required capacity exceeds the applicable cap specified in Table 5 of this appendix, then a facility owner or operator shall ensure, by contract or other approved means as described in §154.1028(a), only for the quantity of resources required to meet the cap, but shall identify sources of additional resources as indicated in §154.1045(m). The owner or operator of a facility whose planning volume exceeds the cap for 1993 must make arrangements to identify and ensure the availability, through contract or other approved means as described in §154.1028(a), of the additional capacity in 1998 or 2003, as appropriate. For a facility that handles, stores, or transports multiple groups of oil, the required effective daily recovery capacity for each group is calculated before applying the cap.

7.3 The following procedures must be used to calculate the planning volume for identifying shoreline cleanup capacity:

7.3.1 The following must be determined: The worst case discharge volume of oil for the facility; the appropriate group(s) for the type of oil handled, stored, or transported at the facility (non-persistent (Group I) or persistent (Groups II, III, or IV)); and the operating area(s) in which the facility operates. For a facility storing oil from different groups, each group must be calculated separately. Using this information, Table 2 of this appendix must be used to determine the

percentages of the total planning volume to be used for shoreline cleanup resource planning.

7.3.2 The shoreline cleanup planning volume must be adjusted to reflect an emulsification factor using the same procedure as described in section 7.2.2.

7.3.3 The resulting volume will be used to identify an oil spill removal organization with the appropriate shoreline cleanup capability.

7.3.4 The following is an example of the procedure described above: A facility receives oil from barges via a dock located on a bay and transported by piping to storage tanks. The facility handles Number 6 oil (specific gravity .96) and stores the oil in tanks where it is held prior to being burned in an electric generating plant. The MTR segment of the facility has six 18-inch diameter pipelines running one mile from the dock-side manifold to several storage tanks which are located in the non-transportation-related portion of the facility. Although the facility piping has a normal working pressure of 100 pounds per square inch, the piping has a maximum allowable working pressure (MAWP) of 150 pounds per square inch. At MAWP, the pumping system can move 10,000 barrels (bbls) of Number 6 oil every hour through each pipeline. The facility has a rotating watchman who is required to drive the length of the piping every 2 hours when the facility is receiving oil from a barge. The facility operator estimates that it will take approximately 10 minutes to secure pumping operations when a discharge is discovered. Using the definition of worst case discharge provided in §154.1029(b)(ii), the following calculation is provided:

|   | bbls.         |
|---|---------------|
| 2 hrs + 0.17 hour × 10,000 bbls per hour .....                          | 21,700        |
| Piping volume = 37,322 ft <sup>3</sup> + 5.6 ft <sup>3</sup> /bbl ..... | <u>+6,664</u> |
| Discharge volume per pipe .....   | 28,364        |
| Number of pipelines .....   | <u>×6</u>     |
| Worst case discharge from MTR facility .....                            | 170,184       |

To calculate the planning volumes for on-shore recovery:

Worst case discharge: 170,184 bbls. Group IV

oil

Emulsification factor (from Table 3): 1.4

Operating Area impacted: Inland

Planned percent oil onshore recovery (from Table 2): Inland 70%

Planning volumes for onshore recovery: Inland 170,184 × .7 × 1.4 = 166,780 bbls.

Conclusion: The facility owner or operator must contract with a response resource capable of managing a 166,780 barrel shoreline cleanup.

To calculate the planning volumes for on-water recovery:

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Worst case discharge: 170,184 bbls. Group IV oil

Emulsification factor (from Table 3): 1.4

Operating Area impacted: Inland

Planned percent oil on-water recovery (from Table 2): Inland 50%

Planning volumes for on-water recovery: Inland  $170,184 \times .5 \times 1.4 = 119,128$  bbls.

To determine the required resources for on-water recovery for each tier, use the mobilization factors from Table 4:

|                             | Tier 1 | Tier 2 | Tier 3 |
|-----------------------------|--------|--------|--------|
| Inland = 119,128 bbls. .... | x .15  | x .25  | x .40  |
| Barrels per day (pbd) ....  | 17,869 | 29,782 | 47,652 |

Conclusion: Since the requirements for all tiers for inland exceed the caps, the facility owner will only need to contract for 10,000 bpd for Tier 1, 20,000 bpd for Tier 2, and 40,000 bpd for Tier 3. Sources for the bpd on-water recovery resources above the caps for all three Tiers need only be identified in the response plan.

Twenty percent of the capability for Inland, for all tiers, must be capable of operating in water with a depth of 6 feet or less.

The facility owner or operator will also be required to identify or ensure, by contract or other approved means as described in §154.1028(a), sufficient response resources required under §§154.1035(b)(4) and 154.1045(k) to protect fish and wildlife and sensitive environments identified in the response plan for the worst case discharge from the facility.

The COTP has the discretion to accept that a facility can operate only a limited number of the total pipelines at a dock at a time. In those circumstances, the worst case discharge must include the drainage volume from the piping normally not in use in addition to the drainage volume and volume of oil discharged during discovery and shut down of the oil discharge from the operating piping.

#### *8. Determining the Availability of Alternative Response Methods*

8.1 Response plans for facilities that handle, store, or transport Groups II or III persistent oils that operate in an area with year-round preapproval for dispersant use may receive credit for up to 25 percent of their required on-water recovery capacity for 1993 if the availability of these resources is ensured by contract or other approved means as described in §154.1028(a). For response plan credit, these resources must be capable of being on-scene within 12 hours of a discharge.

8.2 To receive credit against any required on-water recover capacity a response plan must identify the locations of dispersant stockpiles, methods of shipping to a staging area, and appropriate aircraft, vessels, or fa-

cilities to apply the dispersant and monitor its effectiveness at the scene of an oil discharge.

8.2.1 Sufficient volumes of dispersants must be available to treat the oil at the dosage rate recommended by the dispersant manufacturer. Dispersants identified in a response plan must be on the NCP Product Schedule that is maintained by the Environmental Protection Agency. (Some states have a list of approved dispersants and within state waters only they can be used.)

8.2.2 Dispersant application equipment identified in a response plan for credit must be located where it can be mobilized to shoreside staging areas to meet the time requirements in section 8.1 of this appendix. Sufficient equipment capacity and sources of appropriate dispersants should be identified to sustain dispersant application operations for at least 3 days.

8.2.3 Credit against on-water recovery capacity in preapproved areas will be based on the ability to treat oil at a rate equivalent to this credit. For example, a 2,500 barrel credit against the Tier 1 10,000 barrel on-water cap would require the facility owner or operator to demonstrate the ability to treat 2,500 barrel/day of oil at the manufacturers recommended dosage rate. Assuming a dosage rate of 10:1, the plant would need to show stockpiles and sources of 250 barrels of dispersants at a rate of 250 barrels per day and the ability to apply the dispersant at that daily rate for 3 days in the geographic area in which the facility is located. Similar data would need to be provided for any additional credit against Tier 2 and 3 resources.

8.3 In addition to the equipment and supplies required, a facility owner or operator shall identify a source of support to conduct the monitoring and post-use effectiveness evaluation required by applicable regional plans and ACPs.

8.4 Identification of the response resources for dispersant application does not imply that the use of this technique will be authorized. Actual authorization for use during a spill response will be governed by the provisions of the NCP and the applicable regional plan or ACP. A facility owner or operator who operates a facility in areas with year-round preapproval of dispersant can reduce the required on-water recovery capacity for 1993 up to 25 percent. A facility owner or operator may reduce the required on water recovery cap increase for 1998 and 2003 up to 50 percent by identifying pre-approved alternative response methods.

8.5 In addition to the credit identified above, a facility owner or operator that operates in a year-round area pre-approved for dispersant use may reduce their required on water recover cap increase for 1998 and 2003 by up to 50 percent by identifying non-mechanical methods.

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8.6 The use of in-situ burning as a non-mechanical response method is still being studied. Because limitations and uncertainties remain for the use of this method, it may not be used to reduce required oil recovery capacity in 1993.

*9. Additional Equipment Necessary to Sustain Response Operations*

9.1 A facility owner or operator is responsible for ensuring that sufficient numbers of trained personnel and boats, aerial spotting aircraft, containment boom, sorbent materials, boom anchoring materials, and other supplies are available to sustain response operations to completion. All such equipment must be suitable for use with the primary equipment identified in the response plan. A facility owner or operator is not required to list these response resources, but shall certify their availability.

9.2 A facility owner or operator shall evaluate the availability of adequate temporary storage capacity to sustain the effective daily recovery capacities from equipment identified in the plan. Because of the inefficiencies of oil spill recovery devices, response plans must identify daily storage capacity equivalent to twice the effective daily recovery rate required on scene. This temporary storage capacity may be reduced if a facility owner or operator can demonstrate by waste stream analysis that the efficiencies of the oil recovery devices, ability to decant waste, or the availability of alternative temporary storage or disposal locations will reduce the overall volume of oily material storage requirement.

9.3 A facility owner or operator shall ensure that his or her planning includes the capability to arrange for disposal of recovered oil products. Specific disposal procedures will be addressed in the applicable ACP.

TABLE 1.—RESPONSE RESOURCE OPERATING CRITERIA OIL RECOVERY DEVICES

| Operating environment                        |  | Significant wave height <sup>1</sup> |           | Sea State   |
|--|--|--------------------------------------|-----------|-------------|
| Rivers and Canals .....                      |  | ≤1 Foot .....                        | ≤4        | 1           |
| Inland .....                                 |  | ≤3 feet .....                        | 2         | 2           |
| Great Lakes .....                            |  | ≤4 feet .....                        | 2-3       | 2-3         |
| Ocean .....                                  |  | ≤6 feet .....                        | 3-4       | 3-4         |
| BOOM   |  |                                      |           |             |
| Boom property                                |  | Use                                  |           |             |
|  |  | Rivers and canals                    | Inland    | Great Lakes |
| Significant Wave Height <sup>1</sup> .....   |  | ≤1                                   | ≤3        | ≤4          |
| Sea State .....                              |  | 1                                    | 2         | 2-3         |
| Boom height—in. (draft plus freeboard) ..... |  | 6-18                                 | 18-42     | 18-42       |
| Reserve Buoyancy to Weight Ratio .....       |  | 2:1                                  | 2:1       | 2:1         |
| Total Tensile Strength—lbs .....             |  | 4,500                                | 15-20,000 | 15-20,000   |
| Skirt Fabric Tensile Strength—lbs .....      |  | 200                                  | 300       | 300         |
| Skirt Fabric Tear Strength—lbs .....         |  | 100                                  | 100       | 100         |
|  |  |                                      |           | 3:1 to 4:1  |
|  |  |                                      |           | ≤20,000     |
|  |  |                                      |           | 500         |
|  |  |                                      |           | 125         |

<sup>1</sup> Oil recovery devices and boom must be at least capable of operating in wave heights up to and including the values listed in Table 1 for each operating environment.

TABLE 2.—REMOVAL CAPACITY PLANNING TABLE

| Spill location                          | Rivers and canals     |                          |                | Nearshore/inland      |                          |                | Great Lakes           |                          |                | Offshore |  |  |
|---|-----------------------|--------------------------|----------------|-----------------------|--------------------------|----------------|-----------------------|--------------------------|----------------|----------|--|--|
|   | 3 Days                |                          |                | 4 Days                |                          |                | 6 Days                |                          |                |          |  |  |
| Sustainability of on-water oil recovery | % Natural dissipation | % Recovered floating oil | % Oil on shore | % Natural dissipation | % Recovered floating oil | % Oil on shore | % Natural dissipation | % Recovered floating oil | % Oil on shore |          |  |  |
|   | Oil group             |                          |                |                       |                          |                |                       |                          |                |          |  |  |
| 1 Non-persistent oils .....             | 80                    | 10                       | 10             | 80                    | 20                       | 10             | 95                    | 5                        | /              |          |  |  |
| 2 Light crudes .....                    | 40                    | 15                       | 45             | 50                    | 50                       | 30             | 75                    | 25                       | 5              |          |  |  |
| 3 Medium crudes and fuels .....         | 20                    | 15                       | 65             | 30                    | 50                       | 50             | 60                    | 40                       | 20             |          |  |  |
| 4 Heavy crudes and fuels .....          | 5                     | 20                       | 75             | 10                    | 50                       | 70             | 50                    | 40                       | 30             |          |  |  |

TABLE 3.—EMULSIFICATION FACTORS FOR PETROLEUM OIL GROUPS

|                     |     |
|---------------------|-----|
| Non-Persistent Oil: |     |
| Group I .....       | 1.0 |
| Persistent Oil:     |     |

TABLE 3.—EMULSIFICATION FACTORS FOR PETROLEUM OIL GROUPS—Continued

|                 |     |
|-----------------|-----|
| Group II .....  | 1.8 |
| Group III ..... | 2.0 |
| Group IV .....  | 1.4 |

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TABLE 4.—ON WATER OIL RECOVERY RESOURCE MOBILIZATION FACTORS

| Operating Area                     | Tier 1 | Tier 2 | Tier 3 |
|------------------------------------|--------|--------|--------|
| Rivers & Canals .....              | .30    | .40    | .60    |
| Inland/Nearshore/Great Lakes ..... | .15    | .25    | .40    |

TABLE 4.—ON WATER OIL RECOVERY RESOURCE MOBILIZATION FACTORS—Continued

| Operating Area | Tier 1 | Tier 2 | Tier 3 |
|----------------|--------|--------|--------|
| Offshore ..... | .10    | .165   | .21    |

Note: These mobilization factors are for total response resources mobilized, not incremental response resources.

TABLE 5.—RESPONSE CAPABILITY CAPS BY OPERATING AREA

|  | Tier 1               | Tier 2               | Tier 3          |
|--|----------------------|----------------------|-----------------|
| February 18, 1993:                         |                      |                      |                 |
| All except rivers and canals, Great Lakes. | 10K bbls/day .....   | 20K bbls/day .....   | 40K bbls/day/   |
| Great Lakes .....                          | 5K bbls/day .....    | 10K bbls/day .....   | 20K bbls/day.   |
| Rivers and canals .....                    | 1,500 bbls/day ..... | 3,000 bbls/day ..... | 6,000 bbls/day. |
| February 18, 1998:                         |                      |                      |                 |
| All except rivers and canals, Great Lakes. | 12.5K bbls/day ..... | 25K bbls/day .....   | 50K bbls/day.   |
| Great Lakes .....                          | 6.35K bbls/day ..... | 12.3K bbls/day ..... | 25K bbls/day.   |
| Rivers and canals .....                    | 1,875 bbls/day ..... | 3,750 bbls/day ..... | 7,500 bbls/day. |
| February 18, 2003:                         |                      |                      |                 |
| All except rivers and canals, Great Lakes. | TBD .....            | TBD .....            | TBD.            |
| Great Lakes .....                          | TBD .....            | TBD .....            | TBD.            |
| Rivers and canals .....                    | TBD .....            | TBD .....            | TBD.            |

Note: The caps show cumulative overall effective daily recovery capacity, not incremental increases.  
TBD = To be determined.

[CGD 91-036, 61 FR 7933, Feb. 29, 1996, as amended by CGD 96-026, 61 FR 33666, June 28, 1996]

**APPENDIX D TO PART 154—TRAINING ELEMENTS FOR OIL SPILL RESPONSE PLANS**

*1. General*

1.1 The portion of the plan dealing with training is one of the key elements of a response plan. This concept is clearly expressed by the fact that Congress, in writing OPA 90, specifically included training as one of the sections required in a vessel or facility response plan. In reviewing submitted response plans, it has been noted that the plans often do not provide sufficient information in the training section of the plan for either the user or the reviewer of the plan. In some cases, plans simply state that the crew and others will be trained in their duties and responsibilities, with no other information being provided. In other plans, information is simply given that required parties will receive the necessary worker safety training (HAZWOPER).

1.2 The training section of the plan need not be a detailed course syllabus, but it must contain sufficient information to allow the user and reviewer (or evaluator) to have an understanding of those areas that are believed to be critical. Plans should identify key skill areas and the training that is required to ensure that the individual identified will be capable of performing the duties

prescribed to them. It should also describe how the training will be delivered to the various personnel. Further, this section of the plan must work in harmony with those sections of the plan dealing with exercises, the spill management team, and the qualified individual.

1.3 The material in this appendix D is not all-inclusive and is provided for guidance only.

*2. Elements To Be Addressed*

2.1 To assist in the preparation of the training section of a facility response plan, some of the key elements that should be addressed are indicated in the following sections. Again, while it is not necessary that the comprehensive training program for the company be included in the response plan, it is necessary for the plan to convey the elements that define the program as appropriate.

2.2 An effective spill response training program should consider and address the following:

2.2.1 Notification requirements and procedures.

2.2.2 Communication system(s) used for the notifications.

2.2.3 Procedures to mitigate or prevent any discharge or a substantial threat of a discharge of oil resulting from failure of manifold, mechanical loading arm, or other transfer equipment or hoses, as appropriate;

2.2.3.1 Tank overfill;

2.2.3.2 Tank rupture;

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## ATTACHMENT 1

| Inflammable gas or vapour                        | Experimental maximum safe gap |                    |
|--|-------------------------------|--------------------|
|  | mm                            | in.                |
| Methane .....                                    | 1.170                         | 0.046              |
| Blast furnace gas .....                          | 1.193                         | 0.047              |
| Propane .....                                    | 0.965                         | 0.038              |
| Butane .....                                     | 1.066                         | 0.042              |
| Pentane .....                                    | 1.016                         | 0.040              |
| Hexane .....                                     | 0.965                         | 0.038              |
| Heptane .....                                    | 0.965                         | 0.038              |
| Iso-octane .....                                 | 1.040                         | 0.041              |
| Decane .....                                     | 1.016                         | 0.040              |
| Benzene .....                                    | 0.99                          | 0.039              |
| Xylene .....                                     | 1.066                         | 0.042              |
| Cyclohexane .....                                | 0.94                          | 0.037              |
| Acetone .....                                    | 1.016                         | 0.040              |
| Ethylene .....                                   | 0.71                          | 0.028              |
| Methyl-ethyl-ketone .....                        | 1.016                         | 0.040              |
| Carbon monoxide .....                            | 0.915                         | 0.036              |
| Methyl-acetate .....                             | 0.990                         | 0.039              |
| Ethyl-acetate .....                              | 1.04                          | 0.041              |
| Propyl-acetate .....                             | 1.04                          | 0.041              |
| Butyl-acetate .....                              | 1.016                         | 0.040              |
| Amyl-acetate .....                               | 0.99                          | 0.039              |
| Methyl alcohol .....                             | 0.915                         | 0.036              |
| Ethyl alcohol .....                              | 1.016                         | 0.040              |
| Iso-butyl-alcohol .....                          | 0.965                         | 0.038              |
| Butyl-alcohol (Normal) .....                     | 0.94                          | 0.037              |
| Amyl-alcohol .....                               | 0.99                          | 0.039              |
| Ethyl-ether .....                                | 0.864                         | 0.034              |
| Coal gas (H <sub>2</sub> 57%) .....              | 0.482                         | 0.019              |
| Acetylene .....                                  | ≤0.025                        | ≤0.001             |
| Carbon disulphide .....                          | 0.203                         | 0.008              |
| Hydrogen .....                                   | 0.102                         | 0.004              |
| Blue water gas (H <sub>2</sub> 53% CO 47%) ..... | 0.203                         | 0.008              |
| Ethyl nitrate .....                              | ≤0.025                        | ≤0.001             |
| Ammonia .....                                    | <sup>1</sup> 3.33             | <sup>1</sup> 0.133 |
| Ethylene oxide .....                             | 0.65                          | 0.026              |
| Ethyl nitrite .....                              | 0.922                         | 0.038              |

<sup>1</sup> Approximately.

[CGD 88-102, 55 FR 25435, June 21, 1990; 55 FR 39270, Sept. 26, 1990, as amended by CGD 96-026, 61 FR 33666, June 28, 1996; USCG-1999-5832, 64 FR 34715, June 29, 1999; USCG-2000-7223, 65 FR 40058, June 29, 2000; USCG-2010-0351, 75 FR 36284, June 25, 2010; USCG-1999-5150, 78 FR 42641, July 16, 2013]

## APPENDIX B TO PART 154 [RESERVED]

## APPENDIX C TO PART 154—GUIDELINES FOR DETERMINING AND EVALUATING REQUIRED RESPONSE RESOURCES FOR FACILITY RESPONSE PLANS

## 1. Purpose

1.1 The purpose of this appendix is to describe the procedures for identifying response resources to meet the requirements of subpart F of this part. These guidelines will be used by the facility owner or operator in preparing the response plan and by the Captain of the Port (COTP) when reviewing them. Response resources identified in subparts H and I of this part should be selected using the guidelines in section 2 and Table 1 of this appendix.

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## 2. Equipment Operability and Readiness

2.1 All equipment identified in a response plan must be designed to operate in the conditions expected in the facility's geographic area. These conditions vary widely based on location and season. Therefore, it is difficult to identify a single stockpile of response equipment that will function effectively in each geographic location.

2.2 Facilities handling, storing, or transporting oil in more than one operating environment as indicated in Table 1 of this appendix must identify equipment capable of successfully functioning in each operating environment.

2.3 When identifying equipment for response plan credit, a facility owner or operator must consider the inherent limitations in the operability of equipment components and response systems. The criteria in Table 1 of this appendix should be used for evaluating the operability in a given environment. These criteria reflect the general conditions in certain operating areas.

2.3.1 The Coast Guard may require documentation that the boom identified in a response plan meets the criteria in Table 1. Absent acceptable documentation, the Coast Guard may require that the boom be tested to demonstrate that it meets the criteria in Table 1. Testing must be in accordance with ASTM F 715 (incorporated by reference, see §154.106), or other tests approved by the Coast Guard.

2.4 Table 1 of this appendix lists criteria for oil recovery devices and boom. All other equipment necessary to sustain or support response operations in the specified operating environment must be designed to function in the same conditions. For example, boats which deploy or support skimmers or boom must be capable of being safely operated in the significant wave heights listed for the applicable operating environment.

2.5 A facility owner or operator must refer to the applicable local contingency plan or ACP, as appropriate, to determine if ice, debris, and weather-related visibility are significant factors in evaluating the operability of equipment. The local contingency plan or ACP will also identify the average temperature ranges expected in the facility's operating area. All equipment identified in a response plan must be designed to operate within those conditions or ranges.

2.6 The requirements of subparts F, G, H and I of this part establish response resource mobilization and response times. The distance of the facility from the storage location of the response resources must be used to determine whether the resources can arrive on scene within the stated time. A facility owner or operator shall include the time for notification, mobilization, and travel time of response resources identified to meet the maximum most probable discharge and

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Tier 1 worst case discharge response time requirements. For subparts F and G, tier 2 and 3 response resources must be notified and mobilized as necessary to meet the requirements for arrival on scene in accordance with §154.1045 or §154.1047 of subpart F, or §154.1135 of subpart G, as appropriate. An on water speed of 5 knots and a land speed of 35 miles per hour is assumed unless the facility owner or operator can demonstrate otherwise.

2.7 For subparts F and G, in identifying equipment, the facility owner or operator shall list the storage location, quantity, and manufacturer's make and model. For oil recovery devices, the effective daily recovery capacity, as determined using section 6 of this appendix must be included. For boom, the overall boom height (draft plus freeboard) should be included. A facility owner or operator is responsible for ensuring that identified boom has compatible connectors.

2.8 For subparts H and I, in identifying equipment, the facility owner or operator shall list the storage location, quantity, and manufacturer's make and model. For boom, the overall boom height (draft plus freeboard) should be included. A facility owner or operator is responsible for ensuring that identified boom has compatible connectors.

*3. Determining Response Resources Required for the Average Most Probable Discharge*

3.1 A facility owner or operator shall identify sufficient response resources available, through contract or other approved means as described in §154.1028(a), to respond to the average most probable discharge. The equipment must be designed to function in the operating environment at the point of expected use.

3.2 The response resources must include:

3.2.1 1,000 feet of containment boom or two times the length of the largest vessel that regularly conducts oil transfers to or from the facility, whichever is greater, and a means deploying it available at the spill site within 1 hour of the discovery of a spill.

3.2.2 Oil recovery devices with an effective daily recovery capacity equal to the amount of oil discharged in an average most probable discharge or greater available at the facility within 2 hours of the detection of an oil discharge.

3.2.3 Oil storage capacity for recovered oily material indicated in section 9.2 of this appendix.

*4. Determining Response Resources Required for the Maximum Most Probable Discharge*

4.1 A facility owner or operator shall identify sufficient response resources available, by contract or other approved means as described in §154.1028(a), to respond to dis-

charges up to the maximum most probable discharge volume for that facility. This will require response resources capable of containing and collecting up to 1,200 barrels of oil or 10 percent of the worst case discharge, whichever is less. All equipment identified must be designed to operate in the applicable operating environment specified in Table 1 of this appendix.

4.2 Oil recovery devices identified to meet the applicable maximum most probable discharge volume planning criteria must be located such that they arrive on scene within 6 hours in higher volume port areas (as defined in §154.1020) and the Great Lakes and within 12 hours in all other areas.

4.3 Because rapid control, containment, and removal of oil is critical to reduce spill impact, the effective daily recovery capacity for oil recovery devices must equal 50 percent of the planning volume applicable for the facility as determined in section 4.1 of this appendix. The effective daily recovery capacity for oil recovery devices identified in the plan must be determined using the criteria in section 6 of this appendix.

4.4 In addition to oil recovery capacity, the plan must identify sufficient quantities of containment boom available, by contract or other approved means as described in §154.1028(a), to arrive within the required response times for oil collection and containment and for protection of fish and wildlife and sensitive environments. While the regulation does not set required quantities of boom for oil collection and containment, the response plan must identify and ensure, by contract or other approved means as described in §154.1028(a), the availability of the boom identified in the plan for this purpose.

4.5 The plan must indicate the availability of temporary storage capacity to meet the guidelines of section 9.2 of this appendix. If available storage capacity is insufficient to meet this level, then the effective daily recovery capacity must be derated to the limits of the available storage capacity.

4.6 The following is an example of a maximum most probable discharge volume planning calculation for equipment identification in a higher volume port area: The facility's worst case discharge volume is 20,000 barrels. Ten percent of this is 2,000 barrels. Since this is greater than 1,200 barrels, 1,200 barrels is used as the planning volume. The effective daily recovery capacity must be 50 percent of this, or 600 barrels per day. The ability of oil recovery devices to meet this capacity will be calculated using the procedures in section 6 of this appendix. Temporary storage capacity available on scene must equal twice the daily recovery rate as indicated in section 9 of this appendix, or 1,200 barrels per day. This is the information the facility owner or operator will use to identify and ensure the availability of, through contract or other approved means as

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described in §154.1028(a), the required response resources. The facility owner will also need to identify how much boom is available for use.

*5. Determining Response Resources Required for the Worst Case Discharge to the Maximum Extent Practicable*

5.1 A facility owner or operator shall identify and ensure availability of, by contract or other approved means, as described in §154.1028(a), sufficient response resources to respond to the worst case discharge of oil to the maximum extent practicable. Section 7 of this appendix describes the method to determine the required response resources.

5.2 Oil spill response resources identified in the response plan and available through contract or other approved means, as described in §154.1028(a), to meet the applicable worst case discharge planning volume must be located such that they can arrive at the scene of a discharge within the times specified for the applicable response tiers listed in §154.1045.

5.3 The effective daily recovery capacity for oil recovery devices identified in a response plan must be determined using the criteria in section 6 of this appendix. A facility owner or operator shall identify the storage locations of all response resources that must be used to fulfill the requirements for each tier. The owner or operator of a facility whose required daily recovery capacity exceeds the applicable response capability caps in Table 5 of this appendix shall identify sources of additional equipment, their locations, and the arrangements made to obtain this equipment during a response. The owner or operator of a facility whose calculated planning volume exceeds the applicable contracting caps in Table 5 shall identify sources of additional equipment equal to twice the cap listed in Tiers 1, 2, and 3 or the amount necessary to reach the calculated planning volume, whichever is lower. The resources identified above the cap must be capable of arriving on scene not later than the Tiers 1, 2, and 3 response times in §154.1045. No contract is required. While general listings of available response equipment may be used to identify additional sources, a response plan must identify the specific sources, locations, and quantities of equipment that a facility owner or operator has considered in his or her planning. When listing Coast Guard classified oil spill removal organization(s) which have sufficient removal capacity to recover the volume above the response capability cap for the specific facility, as specified in Table 5 of this appendix, it is not necessary to list specific quantities of equipment.

5.4 A facility owner or operator shall identify the availability of temporary storage capacity to meet the requirements of section 9.2 of this appendix. If available stor-

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age capacity is insufficient to meet this requirement, then the effective daily recovery capacity must be derated to the limits of the available storage capacity.

5.5 When selecting response resources necessary to meet the response plan requirements, the facility owner or operator must ensure that a portion of those resources are capable of being used in close-to-shore response activities in shallow water. The following percentages of the on-water response equipment identified for the applicable geographic area must be capable of operating in waters of 6 feet or less depth:

(i) Offshore—10 percent

(ii) Nearshore/inland/Great Lakes/rivers and canals—20 percent.

5.6 In addition to oil spill recovery devices, a facility owner or operator shall identify sufficient quantities of boom that are available, by contract or other approved means as described in §154.1028(a), to arrive on scene within the required response times for oil containment and collection. The specific quantity of boom required for collection and containment will depend on the specific recovery equipment and strategies employed. A facility owner or operator shall also identify sufficient quantities of oil containment boom to protect fish and wildlife and sensitive environments for the number of days and geographic areas specified in Table 2. Sections 154.1035(b)(4)(ii) and 154.1040(a), as appropriate, shall be used to determine the amount of containment boom required, through contract or other approved means as described in §154.1028(a), to protect fish and wildlife and sensitive environments.

5.7 A facility owner or operator must also identify, through contract or other approved means as described in §154.1028(a), the availability of an oil spill removal organization capable of responding to a shoreline cleanup operation involving the calculated volume of oil and emulsified oil that might impact the affected shoreline. The volume of oil that must be planned for is calculated through the application of factors contained in Tables 2 and 3. The volume calculated from these tables is intended to assist the facility owner or operator in identifying a contractor with sufficient resources and expertise. This planning volume is not used explicitly to determine a required amount of equipment and personnel.

*6. Determining Effective Daily Recovery Capacity for Oil Recovery Devices*

6.1 Oil recovery devices identified by a facility owner or operator must be identified by manufacturer, model, and effective daily recovery capacity. These rates must be used to determine whether there is sufficient capacity to meet the applicable planning criteria for the average most probable discharge, maximum most probable discharge,

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and worst case discharge to the maximum extent practicable.

6.2 For the purpose of determining the effective daily recovery capacity of oil recovery devices, the formula listed in section 6.2.1 of this appendix will be used. This method considers potential limitations due to available daylight, weather, sea state, and percentage of emulsified oil in the recovered material. The Coast Guard may assign a lower efficiency factor to equipment listed in a response plan if it determines that such a reduction is warranted.

6.2.1 The following formula must be used to calculate the effective daily recovery capacity:

$$R=T \times 24 \text{ hours} \times E$$

R=Effective daily recovery capacity

T=Throughout rate in barrels per hour (nameplate capacity)

E=20 percent Efficiency factor (or lower factor as determined by Coast Guard)

6.2.2 For those devices in which the pump limits the throughput of liquid, throughput rate will be calculated using the pump capacity.

6.2.3 For belt or mop type devices, the throughput rate will be calculated using the speed of the belt or mop through the device, assumed thickness of oil adhering to or collected by the device, and surface area of the belt or mop. For purposes of this calculation, the assumed thickness of oil will be  $\frac{1}{4}$  inch.

6.2.4 Facility owners or operators including oil recovery devices whose throughput is not measurable using a pump capacity or belt/mop speed may provide information to support an alternative method of calculation. This information must be submitted following the procedures in paragraph 6.3.2 of this appendix.

6.3 As an alternative to 6.2, a facility owner or operator may submit adequate evidence that a different effective daily recovery capacity should be applied for a specific oil recovery device. Adequate evidence is actual verified performance data in spill conditions or tests using ASTM F 631 (incorporated by reference, see §154.106), or an equivalent test approved by the Coast Guard.

6.3.1 The following formula must be used to calculate the effective daily recovery capacity under this alternative:

$$R=D \times U$$

R=Effective daily recovery capacity

D=Average Oil Recovery Rate in barrels per hour (Item 26 in ASTM F 808; Item 13.2.16 in ASTM F 631; or actual performance data)

U=Hours per day that a facility owner or operator can document capability to operate equipment under spill conditions. Ten hours per day must be used unless a facility owner or operator can demonstrate that the recovery operation can be sustained for longer periods.

6.3.2 A facility owner or operator proposing a different effective daily recovery rate for use in a response plan shall provide data for the oil recovery devices listed. The following is an example of these calculations:

A weir skimmer identified in a response plan has a manufacturer's rated throughput at the pump of 267 gallons per minute (gpm).  
 $267 \text{ gpm} = 381 \text{ barrels per hour}$   
 $R = 381 \times 24 \times 2 = 1829 \text{ barrels per day}$

After testing using ASTM procedures, the skimmer's oil recovery rate is determined to be 220 gpm. The facility owner or operator identifies sufficient response resources available to support operations 12 hours per day.  
 $220 \text{ gpm} = 314 \text{ barrels per hour}$   
 $R = 314 \times 12 = 3768 \text{ barrels per day}$

The facility owner or operator will be able to use the higher rate if sufficient temporary oil storage capacity is available. Determinations of alternative efficiency factors under paragraph 6.2 or alternative effective daily recovery capacities under paragraph 6.3 of this appendix will be made by Commandant, (CG-535), 2100 2nd St., SW., Stop 7363, Washington, DC 20593-7363. Response contractors or equipment manufacturers may submit required information on behalf of multiple facility owners or operators directly in lieu of including the request with the response plan submission.

#### *7. Calculating the Worst Case Discharge Planning Volumes*

7.1 The facility owner or operator shall plan for a response to a facility's worst case discharge. The planning for on-water recovery must take into account a loss of some oil to the environment due to evaporative and natural dissipation, potential increases in volume due to emulsification, and the potential for deposit of some oil on the shoreline.

7.2 The following procedures must be used to calculate the planning volume used by a facility owner or operator for determining required on water recovery capacity:

7.2.1 The following must be determined: The worst case discharge volume of oil in the facility; the appropriate group(s) for the type of oil handled, stored, or transported at the facility (non-persistent (Group I) or persistent (Groups II, III, or IV)); and the facility's specific operating area. Facilities which handle, store, or transport oil from different petroleum oil groups must calculate each group separately. This information is to be used with Table 2 of this appendix to determine the percentages of the total volume to be used for removal capacity planning. This table divides the volume into three categories: Oil lost to the environment; oil deposited on the shoreline; and oil available for on-water recovery.

7.2.2 The on-water oil recovery volume must be adjusted using the appropriate

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emulsification factor found in Table 3 of this appendix. Facilities which handle, store, or transport oil from different petroleum groups must assume that the oil group resulting in the largest on-water recovery volume will be stored in the tank or tanks identified as constituting the worst case discharge.

7.2.3 The adjusted volume is multiplied by the on-water oil recovery resource mobilization factor found in Table 4 of this appendix from the appropriate operating area and response tier to determine the total on-water oil recovery capacity in barrels per day that must be identified or contracted for to arrive on-scene with the applicable time for each response tier. Three tiers are specified. For higher volume port areas, the contracted tiers of resources must be located such that they can arrive on scene within 6, 30, and 54 hours of the discovery of an oil discharge. For all other river, inland, nearshore, offshore areas, and the Great Lakes, these tiers are 12, 36, and 60 hours.

7.2.4 The resulting on-water recovery capacity in barrels per day for each tier must be used to identify response resources necessary to sustain operations in the applicable operating area. The equipment must be capable of sustaining operations for the time period specified in Table 2 of this appendix. The facility owner or operator must identify and ensure the availability, through contract or other approved means as described in §154.1028(a), of sufficient oil spill recovery devices to provide the effective daily recovery oil recovery capacity required. If the required capacity exceeds the applicable cap specified in Table 5 of this appendix, then a facility owner or operator shall ensure, by contract or other approved means as described in §154.1028(a), only for the quantity of resources required to meet the cap, but shall identify sources of additional resources as indicated in §154.1045(m). The owner or operator of a facility whose planning volume exceeds the cap for 1993 must make arrangements to identify and ensure the availability, through contract or other approved means as described in §154.1028(a), of the additional capacity in 1998 or 2003, as appropriate. For a facility that handles, stores, or transports multiple groups of oil, the required effective daily recovery capacity for each group is calculated before applying the cap.

7.3 The following procedures must be used to calculate the planning volume for identifying shoreline cleanup capacity:

7.3.1 The following must be determined: The worst case discharge volume of oil for the facility; the appropriate group(s) for the type of oil handled, stored, or transported at the facility (non-persistent (Group I) or persistent (Groups II, III, or IV)); and the operating area(s) in which the facility operates. For a facility storing oil from different

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groups, each group must be calculated separately. Using this information, Table 2 of this appendix must be used to determine the percentages of the total planning volume to be used for shoreline cleanup resource planning.

7.3.2 The shoreline cleanup planning volume must be adjusted to reflect an emulsification factor using the same procedure as described in section 7.2.2.

7.3.3 The resulting volume will be used to identify an oil spill removal organization with the appropriate shoreline cleanup capability.

7.3.4 The following is an example of the procedure described above: A facility receives oil from barges via a dock located on a bay and transported by piping to storage tanks. The facility handles Number 6 oil (specific gravity .96) and stores the oil in tanks where it is held prior to being burned in an electric generating plant. The MTR segment of the facility has six 18-inch diameter pipelines running one mile from the dock-side manifold to several storage tanks which are located in the non-transportation-related portion of the facility. Although the facility piping has a normal working pressure of 100 pounds per square inch, the piping has a maximum allowable working pressure (MAWP) of 150 pounds per square inch. At MAWP, the pumping system can move 10,000 barrels (bbls) of Number 6 oil every hour through each pipeline. The facility has a roving watchman who is required to drive the length of the piping every 2 hours when the facility is receiving oil from a barge. The facility operator estimates that it will take approximately 10 minutes to secure pumping operations when a discharge is discovered. Using the definition of worst case discharge provided in §154.1029(b)(ii), the following calculation is provided:

|  |            |
|--|------------|
| 2 hrs + 0.17 hour $\times$ 10,000 bbls per hour .....                        | 21,700     |
| Piping volume = 37,322 ft <sup>3</sup> $\div$ 5.6 ft <sup>3</sup> /bbl ..... | +6,664     |
| Discharge volume per pipe .....  | 28,364     |
| Number of pipelines .....  | $\times 6$ |
| Worst case discharge from MTR facility .....                                 | 170,184    |

To calculate the planning volumes for onshore recovery:

Worst case discharge: 170,184 bbls. Group IV

oil

Emulsification factor (from Table 3): 1.4

Operating Area impacted: Inland

Planned percent oil onshore recovery (from Table 2): Inland 70%

Planning volumes for onshore recovery: Inland  $170,184 \times 70\% = 119,128$  bbls.

Conclusion: The facility owner or operator must contract with a response resource capable of managing a 166,780 barrel shoreline cleanup.

To calculate the planning volumes for on-water recovery:

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Worst case discharge: 170,184 bbls. Group IV oil  
 Emulsification factor (from Table 3): 1.4  
 Operating Area impacted: Inland  
 Planned percent oil on-water recovery (from Table 2): Inland 50%  
 Planning volumes for on-water recovery: Inland  $170,184 \times .5 \times 1.4 = 119,128$  bbls.

To determine the required resources for on-water recovery for each tier, use the mobilization factors from Table 4:

|                             | Tier 1       | Tier 2       | Tier 3       |
|-----------------------------|--------------|--------------|--------------|
| Inland = 119,128 bbls. .... | $\times .15$ | $\times .25$ | $\times .40$ |
| Barrels per day (bpd) ....  | 17,869       | 29,782       | 47,652       |

Conclusion: Since the requirements for all tiers for inland exceed the caps, the facility owner will only need to contract for 10,000 bpd for Tier 1, 20,000 bpd for Tier 2, and 40,000 bpd for Tier 3. Sources for the bpd on-water recovery resources above the caps for all three Tiers need only be identified in the response plan.

Twenty percent of the capability for Inland, for all tiers, must be capable of operating in water with a depth of 6 feet or less.

The facility owner or operator will also be required to identify or ensure, by contract or other approved means as described in §154.1028(a), sufficient response resources required under §§154.1035(b)(4) and 154.1045(k) to protect fish and wildlife and sensitive environments identified in the response plan for the worst case discharge from the facility.

The COTP has the discretion to accept that a facility can operate only a limited number of the total pipelines at a dock at a time. In those circumstances, the worst case discharge must include the drainage volume from the piping normally not in use in addition to the drainage volume and volume of oil discharged during discovery and shut down of the oil discharge from the operating piping.

#### *8. Determining the Capability of High-Rate Response Methods*

8.1. Calculate cumulative dispersant application capacity as follows:

8.1.1 A facility owner or operator must plan either for a dispersant capacity to respond to a facility's worst case discharge (WCD) of oil, or for the amount of the dispersant resource cap as required by §154.1045(i)(3) of this chapter, whichever is the lesser amount. When planning for the cumulative application capacity required, the calculations must account for the loss of some oil to the environment due to natural dissipation causes (primarily evaporation). The following procedure must be used to determine the cumulative application requirements:

8.1.2 Determine the WCD volume of oil in gallons and the appropriate oil group for the type of petroleum oil (persistent Groups II, III, and IV). For facilities with mixed petroleum oils, assume a total WCD volume using the group that constitutes the largest portion of the oil being handled or the group with the smallest natural dissipation factor;

8.1.3 Multiply the total WCD amount in gallons by the natural dissipation factor for the appropriate oil group as follows: Group II factor is 0.50; Group III is 0.30; and Group IV is 0.10. This represents the amount of oil that can be expected to be lost to natural dissipation in a nearshore environment. Subtract the oil amount lost to natural dissipation from the total WCD amount to determine the remaining oil available for treatment by dispersant application; and

8.1.4 Multiply the oil available for dispersant treatment by the dispersant-to-oil planning application ratio of 1 part dispersant to 20 parts oil (0.05). The resulting number represents the cumulative total dispersant-application capability that must be ensured available within the first 60 hours.

8.1.5(i) The following is an example of the procedure described in paragraphs 8.1.1 through 8.1.4 above: A facility with a 1,000,000 gallon WCD of crude oil (specific gravity 0.87) is located in an area with pre-authorization for dispersant use in the nearshore environment on the U.S. East Coast:

WCD: 1,000,000 gallons, Group III oil.

Natural dissipation factor for Group III: 30 percent.

General formula to determine oil available for dispersant treatment:  $(WCD) - [(WCD) \times (\text{natural dissipation factor})] = \text{available oil.}$

E.g.,  $1,000,000 \text{ gal} - (1,000,000 \text{ gal} \times .30) = 700,000 \text{ gallons of available oil.}$

Cumulative application capacity = Available oil  $\times$  planning application ratio (1 gal dispersant/20 gals oil = 0.05).

E.g.,  $700,000 \text{ gal oil} \times (0.05) = 35,000 \text{ gallons cumulative dispersant-application capacity.}$

(ii) The requirements for cumulative dispersant-application capacity (35,000 gallons) for this facility's WCD is less than the overall dispersant capability for non-Gulf Coast waters required by §155.1045(i)(3) of this chapter. Because paragraph 8.1.1 of this appendix requires owners and operators to ensure the availability of the lesser of a facility's dispersant requirements for WCD or the amount of the dispersant cap provided for in §154.1045(i)(3), the facility in this example would be required to ensure the availability of 35,000 gallons of dispersant. More specifically, this facility would be required to meet the following tier requirements in §154.1045(i)(3), which total 35,000 gallons application:

Tier 1—4,125 gallons—Completed in 12 hours.

Tier 2—23,375 gallons—Completed in 36 hours.

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Tier 3—7,500 gallons—Completed in 60 hours.

8.2 Determine Effective Daily Application Capacities (EDACs) for dispersant response systems as follows:

8.2.1 EDAC planning estimates for compliance with the dispersant application requirements in §154.1045(i)(3) are to be based on:

8.2.1.1 The spill occurring at the facility;

8.2.1.2 Specific dispersant application platform operational characteristics identified in the Dispersant Mission Planner 2 or as demonstrated by operational tests;

8.2.1.3 Locations of primary dispersant staging sites; and

8.2.1.4 Locations and quantities of dispersant stockpiles.

8.2.2 EDAC calculations with supporting documentation must be submitted to the NSFCC for classification as a Dispersant Oil Spill Removal Organization.

8.2.3(i) EDAC can also be calculated using the Dispersant Mission Planner 2 (DMP2). The DMP2 is a downloadable application that calculates EDAC for different dispersant response systems. It is located on the Internet at: <http://www.response.restoration.noaa.gov/spilltools>.

(ii) The DMP2 contains operating information for the vast majority of dispersant application platforms, including aircraft, both rotary and fixed wing, and vessels. The DMP2 produces EDAC estimates by performing calculations based on performance parameters of dispersant application platforms, locations of primary dispersant staging sites, home-based airport or port locations, and the facility location (for the spill site).

8.2.4 For each Captain of the Port zone where a dispersant response capability is required, the response plan must identify:

8.2.4.1 The type, number, and location of each dispersant-application platform intended for use to meet dispersant delivery requirements specified in §154.1045(i)(3) of this chapter;

8.2.4.2 The amount and location of available dispersant stockpiles to support each platform; and,

8.2.4.3 A primary staging site for each platform that will serve as its base of operations for the duration of the response.

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8.3 In addition to the equipment and supplies required, a facility owner or operator must identify a source of support to conduct the monitoring and post-use effectiveness evaluation required by applicable regional plans and ACPs.

8.4 Identification of the resources for dispersant application does not imply that the use of this technique will be authorized. Actual authorization for use during a spill response will be governed by the provisions of the National Oil and Hazardous Substances Contingency Plan (40 CFR part 300) and the applicable Local or Area Contingency Plan.

*9. Additional Equipment Necessary To Sustain Response Operations*

9.1 A facility owner or operator is responsible for ensuring that sufficient numbers of trained personnel and boats, aerial spotting aircraft, containment boom, sorbent materials, boom anchoring materials, and other supplies are available to sustain response operations to completion. All such equipment must be suitable for use with the primary equipment identified in the response plan. A facility owner or operator is not required to list these response resources, but shall certify their availability.

9.2 A facility owner or operator shall evaluate the availability of adequate temporary storage capacity to sustain the effective daily recovery capacities from equipment identified in the plan. Because of the inefficiencies of oil spill recovery devices, response plans must identify daily storage capacity equivalent to twice the effective daily recovery rate required on scene. This temporary storage capacity may be reduced if a facility owner or operator can demonstrate by waste stream analysis that the efficiencies of the oil recovery devices, ability to decant waste, or the availability of alternative temporary storage or disposal locations will reduce the overall volume of oily material storage requirement.

9.3 A facility owner or operator shall ensure that his or her planning includes the capability to arrange for disposal of recovered oil products. Specific disposal procedures will be addressed in the applicable ACP.

TABLE 1—RESPONSE RESOURCE OPERATING CRITERIA OIL RECOVERY DEVICES

| Operating environment   | Significant wave height <sup>1</sup> | Sea State |
|-------------------------|--------------------------------------|-----------|
| Rivers and Canals ..... | ≤1 Foot .....                        | 1         |
| Inland .....            | ≤3 feet .....                        | 2         |
| Great Lakes .....       | ≤4 feet .....                        | 2-3       |
| Ocean .....             | ≤6 feet .....                        | 3-4       |

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| Boom property                                | BOOM              |           |             |            |
|--|-------------------|-----------|-------------|------------|
|  | Use               |           |             |            |
|  | Rivers and canals | Inland    | Great Lakes | Ocean      |
| Significant Wave Height <sup>1</sup> .....   | ≤1                | ≤3        | ≤4          | ≤6         |
| Sea State .....                              | 1                 | 2         | 2-3         | 3-4        |
| Boom height—in. (draft plus freeboard) ..... | 6-18              | 18-42     | 18-42       | ≤42        |
| Reserve Buoyancy to Weight Ratio .....       | 2:1               | 2:1       | 2:1         | 3:1 to 4:1 |
| Total Tensile Strength—lbs. ....             | 4,500             | 15-20,000 | 15-20,000   | ≤20,000    |
| Skirt Fabric Tensile Strength—lbs .....      | 200               | 300       | 300         | 500        |
| Skirt Fabric Tear Strength—lbs .....         | 100               | 100       | 100         | 125        |

<sup>1</sup> Oil recovery devices and boom must be at least capable of operating in wave heights up to and including the values listed in Table 1 for each operating environment.

TABLE 2—REMOVAL CAPACITY PLANNING TABLE

| Spill location                          | Rivers and canals     |                          |                | Nearshore/inland      |                          |                | Great Lakes           |                          |                | Offshore              |                          |                |
|---|-----------------------|--------------------------|----------------|-----------------------|--------------------------|----------------|-----------------------|--------------------------|----------------|-----------------------|--------------------------|----------------|
|   | 3 Days                |                          |                | 4 Days                |                          |                | 6 Days                |                          |                |                       |                          |                |
| Sustainability of on-water oil recovery | % Natural dissipation | % Recovered floating oil | % Oil on shore | % Natural dissipation | % Recovered floating oil | % Oil on shore | % Natural dissipation | % Recovered floating oil | % Oil on shore | % Natural dissipation | % Recovered floating oil | % Oil on shore |
| 1 Non-persistent oils .....             | 80                    | 10                       | 10             | 80                    | 20                       | 10             | 95                    | 5                        | /              |                       |                          |                |
| 2 Light crudes .....                    | 40                    | 15                       | 45             | 50                    | 50                       | 30             | 75                    | 25                       | 5              |                       |                          |                |
| 3 Medium crudes and fuels .....         | 20                    | 15                       | 65             | 30                    | 50                       | 50             | 60                    | 40                       | 20             |                       |                          |                |
| 4 Heavy crudes and fuels                | 5                     | 20                       | 75             | 10                    | 50                       | 70             | 50                    | 40                       | 30             |                       |                          |                |

TABLE 3—EMULSIFICATION FACTORS FOR PETROLEUM OIL GROUPS

|                     |     |
|---------------------|-----|
| Non-Persistent Oil: |     |
| Group I .....       | 1.0 |
| Persistent Oil:     |     |
| Group II .....      | 1.8 |
| Group III .....     | 2.0 |
| Group IV .....      | 1.4 |

TABLE 4—ON WATER OIL RECOVERY RESOURCE MOBILIZATION FACTORS

| Operating Area                     | Tier 1 | Tier 2 | Tier 3 |
|------------------------------------|--------|--------|--------|
| Rivers & Canals .....              | .30    | .40    | .60    |
| Inland/Nearshore/Great Lakes ..... | .15    | .25    | .40    |
| Offshore .....                     | .10    | .165   | .21    |

Note: These mobilization factors are for total response resources mobilized, not incremental response resources.

TABLE 5—RESPONSE CAPABILITY CAPS BY OPERATING AREA

|  | Tier 1               | Tier 2               | Tier 3          |
|--|----------------------|----------------------|-----------------|
| February 18, 1993:                         |                      |                      |                 |
| All except rivers and canals, Great Lakes. | 10K bbls/day .....   | 20K bbls/day .....   | 40K bbls/day/   |
| Great Lakes .....                          | 5K bbls/day .....    | 10K bbls/day .....   | 20K bbls/day.   |
| Rivers and canals .....                    | 1,500 bbls/day ..... | 3,000 bbls/day ..... | 6,000 bbls/day. |
| February 18, 1998:                         |                      |                      |                 |
| All except rivers and canals, Great Lakes. | 12.5K bbls/day ..... | 25K bbls/day .....   | 50K bbls/day.   |
| Great Lakes .....                          | 6.25K bbls/day ..... | 12.3K bbls/day ..... | 25K bbls/day.   |
| Rivers and canals .....                    | 1,875 bbls/day ..... | 3,750 bbls/day ..... | 7,500 bbls/day. |
| February 18, 2003:                         |                      |                      |                 |
| All except rivers & canals & Great Lakes.  | 12.5K bbls/day ..... | 25K bbls/day .....   | 50K bbls/day.   |
| Great Lakes .....                          | 6.25K bbls/day ..... | 12.3K bbls/day ..... | 25K bbls/day.   |
| Rivers & canals .....                      | 1,875 bbls/day ..... | 3,750 bbls/day ..... | 7,500 bbls/day. |

NOTE: The caps show cumulative overall effective daily recovery capacity, not incremental increases.

TBD = To be determined.

[CGD 91-036, 61 FR 7933, Feb. 29, 1996, as amended by CGD 96-026, 61 FR 33666, June 28, 1996; USCG-1999-5151, 64 FR 67175, Dec. 1, 1999; USCG-2000-7228, 65 FR 40058, June 29, 2000; USCG-2005-21531, 70 FR 36349, June 23, 2005; USCG-2001-8661, 74 FR 45025, Aug. 31, 2009; USCG-2010-0351, 75 FR 36284, June 25, 2010]

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protect the following types of vehicles and equipment: Dump trucks, pickup trucks, cemetery automobiles, gang and circular mowers.

(d) *Interment/committal service shelter.* One permanent shelter is authorized for every five interments per day. The shelter may include a covered area to provide seating for approximately 20 people and an uncovered paved area to provide space for approximately 50 additional people. The shelter may also include a small, enclosed equipment/storage area. Provisions must be made for the playing of Taps by recorded means.

(e) *Public Information Center.* One permanent Public Information Center is authorized per facility. A Public Information Center is used to orient visitors and funeral corteges. It should include the gravesite locator. The public restrooms may also be combined with this structure. Space determinations for separate structures for public restrooms shall be considered on an individual basis. The Public Information Center, including public restrooms, may be combined with the administrative building.

(f) *Other interment structures.* Space determinations for other support facilities such as columbaria, preplaced graveliners (or crypts), garden niches, etc., will be considered on an individual basis in accordance with § 39.60(d).

(Authority: 38 U.S.C. 501, 2408)

**§ 39.63 Architectural design standards.**

The publications listed in this section are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of these publications may be inspected at the office of the State Cemetery Grants Service, National Cemetery Administration, Department of Veterans Affairs, 810 Vermont Avenue, NW., Washington, DC 20420 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). Copies of the 2003 edition of the National Fire Protection

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Association Life Safety Code and Errata (NFPA 101), the 2003 edition of the NFPA 5000, Building Construction and Safety Code, and the 2002 edition of the National Electrical Code, NFPA 70, may be obtained from the National Fire Protection Association, Inc. (NFPA), 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, 800-844-6058 (toll free). Copies of the 2003 edition of the Uniform Mechanical Code and the 2003 edition of the Uniform Plumbing Code may be obtained from the International Association of Plumbing and Mechanical Officials, 5001 E. Philadelphia Street, Ontario, CA 91761-2816. 909-472-4100 (this is not a toll-free number). The 2002 and 2003 NFPA and IAPMO code publications can be inspected at VA by calling 202-461-4902 for an appointment.

(a) *Architectural and structural requirements*—(1) *Life Safety Code.* Standards must be in accordance with the 2003 edition of the National Fire Protection Association Life Safety Code, NFPA 101. Fire safety construction features not included in NFPA 101 shall be designed in accordance with the requirements of the 2003 edition of the NFPA 5000, Building Construction and Safety Code. Where the adopted codes state conflicting requirements, the NFPA National Fire Codes shall govern.

(2) *State and local codes.* In addition to compliance with the standards set forth in this section, all applicable local and State building codes and regulations must be observed. In areas not subject to local or State building codes, the recommendations contained in the 2003 edition of the NFPA 5000, Building Construction and Safety Code, shall apply.

(3) *Occupational safety and health standards.* Applicable standards contained in the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 *et seq.*) must be observed.

(b) *Mechanical requirements.* The heating system, boilers, steam system, ventilation system, and air-conditioning system shall be furnished and installed to meet all requirements of the local and State codes and regulations. Where no local or State codes are in force, the 2003 edition of the Uniform Mechanical Code shall apply.

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(c) *Plumbing requirements.* Plumbing systems shall comply with all applicable local and State codes, the requirements of the State Department of Health, and the minimum general standards as set forth in this part. Where no local or State codes are in force, the 2003 edition of the Uniform Plumbing Code shall apply.

(d) *Electrical requirements.* The installation of electrical work and equipment shall comply with all local and State codes and laws applicable to electrical installations and the minimum general standards set forth in the NFPA 70, National Electrical Code, 2002 edition. The regulations of the local utility company shall govern service connections. Aluminum bus ways shall not be used as a conducting medium in the electrical distribution system.

(Authority: 38 U.S.C. 501, 2408)

**Subpart C—Operation and Maintenance Projects****GRANT REQUIREMENTS AND PROCEDURES****§ 39.80 General requirements for a grant.**

(a) For a State to obtain a grant for the operation or maintenance of a State veterans cemetery:

(1) Its preapplication for the grant must be approved by VA under § 39.81(e);

(2) Its project must be ranked sufficiently high within Priority Group 4 as defined in § 39.3 for the applicable fiscal year so that funds are available for the project, and a grant for the project must not result in payment of more than the \$5 million total amount permissible for all Operation and Maintenance Projects in any fiscal year;

(3) Its plans and specifications for the project must be approved by VA under § 39.82;

(4) The State must meet the application requirements in § 39.84; and

(5) Other requirements specified in §§ 39.6, 39.10, and 39.83 must be satisfied.

(b) VA may approve under § 39.85 any Operation and Maintenance Project grant application up to the amount of the grant requested once the requirements under paragraph (a) of this section have been satisfied, provided that sufficient funds are available and that

total amount of grants awarded during any fiscal year for Operation and Maintenance Projects does not exceed \$5 million. In determining whether sufficient funds are available, VA shall consider the project's ranking in Priority Group 4; the total amount of funds available for cemetery grant awards in Priority Group 4 during the applicable fiscal year; and the prospects of higher ranking projects being ready for the award of a grant before the end of the applicable fiscal year.

(Authority: 38 U.S.C. 501, 2408)

**§ 39.81 Preapplication requirements.**

(a) A State seeking a grant for the operation or maintenance of a State veterans cemetery must submit a preapplication to the Director, State Cemetery Grants Service, through [http://www.cem.va.gov/cem/scg\\_grants.asp](http://www.cem.va.gov/cem/scg_grants.asp).

(b) No detailed drawings, plans, or specifications are required with the preapplication. As a part of the preapplication, the State must submit each of the following:

(1) Standard Form 424 (Application for Federal Assistance) and Standard Form 424C (Budget Information) signed by the authorized representative of the State. These forms document the amount of the grant requested, which may not exceed 100 percent of the estimated cost of the project to be funded with the grant.

(2) VA Form 40-0895-2 (Certification of Compliance with Provisions of the Davis-Bacon Act) to certify that the State has obtained the latest prevailing wage rates for Federally funded projects. Any construction project fully or partially funded with Federal dollars must comply with those rates for specific work by trade employees (e.g., electricians, carpenters).

(3) VA Form 40-0895-6 (Certification of State or Tribal Government Matching Architectural and Engineering Funds to Qualify for Group 1 on the Priority List) to provide documentation that the State has legislative authority to support the project and the resources necessary to initially fund the architectural and engineering portion of the project development. Once

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3.2.6 Use the calculated monitor or monitoring system data averages, maximum values, and percentile values to substitute for missing flow rate and NO<sub>x</sub> emission rate data (and where applicable, NO<sub>x</sub> concentration data) according to the procedures in subpart D of this part.

[58 FR 3701, Jan. 11, 1993, as amended at 60 FR 26547, 26548, May 17, 1995; 63 FR 57313, Oct. 27, 1998; 64 FR 28652, May 26, 1999; 67 FR 40459, June 12, 2002]

**APPENDIX D TO PART 75—OPTIONAL SO<sub>2</sub> EMISSIONS DATA PROTOCOL FOR GAS-FIRED AND OIL-FIRED UNITS**

**1. APPLICABILITY**

1.1 This protocol may be used in lieu of continuous SO<sub>2</sub> pollutant concentration and flow monitors for the purpose of determining hourly SO<sub>2</sub> mass emissions and heat input from: gas-fired units, as defined in §72.2 of this chapter, or oil-fired units, as defined in §72.2 of this chapter. Section 2.1 of this appendix provides procedures for measuring oil or gaseous fuel flow using a fuel flowmeter; section 2.2 of this appendix provides procedures for conducting oil sampling and analysis to determine sulfur content and gross calorific value (GCV) of fuel oil, and section 2.3 of this appendix provides procedures for determining the sulfur content and GCV of gaseous fuels.

1.2 Pursuant to the procedures in §75.20, complete all testing requirements to certify use of this protocol in lieu of a flow monitor and an SO<sub>2</sub> continuous emission monitoring system. Complete all testing requirements no later than the applicable deadline specified in §75.4. Apply to the Administrator for initial certification to use this protocol no later than 45 days after the completion of all certification tests.

**2. PROCEDURE**

**2.1 Fuel Flowmeter Measurements**

For each hour when the unit is combusting fuel, measure and record the flow rate of fuel combusted by the unit, except as provided in section 2.1.4 of this appendix. Measure the flow rate of fuel with an in-line fuel flowmeter, and automatically record the data with a data acquisition and handling system, except as provided in section 2.1.4 of this appendix.

2.1.1 Measure the flow rate of each fuel entering and being combusted by the unit. If, on an annual basis, more than 5.0 percent of the fuel from the main pipe is diverted from the unit without being burned and that diversion occurs downstream of the fuel flowmeter, an additional in-line fuel flowmeter is required to account for the unburned fuel. In this case, record the flow rate of each fuel combusted by the unit as the difference be-

tween the flow measured in the pipe leading to the unit and the flow in the pipe diverting fuel away from the unit. However, the additional fuel flowmeter is not required if, on an annual basis, the total amount of fuel diverted away from the unit, expressed as a percentage of the total annual fuel usage by the unit is demonstrated to be less than or equal to 5.0 percent. The owner or operator may make this demonstration in the following manner:

2.1.1.1 For existing units with fuel usage data from fuel flowmeters, if data are submitted from a previous year demonstrating that the total diverted yearly fuel does not exceed 5% of the total fuel used; or

2.1.1.2 For new units which do not have historical data, if a letter is submitted signed by the designated representative certifying that, in the future, the diverted fuel will not exceed 5.0% of the total annual fuel usage; or

2.1.1.3 By using a method approved by the Administrator under §75.66(d).

2.1.2 Install and use fuel flowmeters meeting the requirements of this appendix in a pipe going to each unit, or install and use a fuel flowmeter in a common pipe header (as defined in §72.2). However, the use of a fuel flowmeter in a common pipe header and the provisions of sections 2.1.2.1 and 2.1.2.2 of this appendix shall not apply to any unit that is using the provisions of subpart H of this part to monitor, record, and report NO<sub>x</sub> mass emissions under a State or federal NO<sub>x</sub> mass emission reduction program, unless both of the following are true: all of the units served by the common pipe are affected units, and all of the units have similar efficiencies. When a fuel flowmeter is installed in a common pipe header, proceed as follows:

2.1.2.1 Measure the fuel flow rate in the common pipe, and combine SO<sub>2</sub> mass emissions (Acid Rain Program units only) for the affected units for recordkeeping and compliance purposes; and

2.1.2.2 Apportion the heat input rate measured at the common pipe to the individual units, using Equation F-21a, F-21b, or F-21d in appendix F to this part.

2.1.3 For a gas-fired unit or an oil-fired unit that continuously or frequently combusts a supplemental fuel for flame stabilization or safety purposes, measure the flow rate of the supplemental fuel with a fuel flowmeter meeting the requirements of this appendix.

**2.1.4 Situations in Which Certified Flowmeter is Not Required**

**2.1.4.1 Start-up or Ignition Fuel**

For an oil-fired unit that uses gas solely for start-up or burner ignition, a gas-fired unit that uses oil solely for start-up or burner ignition, or an oil-fired unit that uses a different grade of oil solely for start-up or

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(d) Continue using the assumed value(s), so long as the sample results do not exceed the assumed value(s). However, if the actual sampled sulfur content, gross calorific value, or density of an oil sample is greater than the assumed value for that parameter, then, consistent with section 2.3.7 of this appendix, begin to use the actual sampled value for sulfur content, gross calorific value, or density of fuel to calculate SO<sub>2</sub> mass emission rate or heat input rate. Consider the sampled value to be the new assumed sulfur content, gross calorific value, or density. Continue using this new assumed value to calculate SO<sub>2</sub> mass emission rate or heat input rate unless and until: it is superseded by a higher value from an oil sample; or (if applicable) it is superseded by a new contract in which case the new contract value becomes the assumed value at the time the fuel specified under the new contract begins to be combusted in the unit; or (if applicable) both the calendar year in which the sampled value exceeded the assumed value and the subsequent calendar year have elapsed.

2.2.5 For each oil sample that is taken on-site at the affected facility, split and label the sample and maintain a portion (at least 200 cc) of it throughout the calendar year and in all cases for not less than 90 calendar days after the end of the calendar year allowance accounting period. This requirement does not apply to oil samples taken from the fuel supplier's storage container, as described in section 2.2.4.3 of this appendix. Analyze oil samples for percent sulfur content by weight in accordance with ASTM D129-00, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), ASTM D1552-01, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method), ASTM D2622-98, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry, ASTM D4294-98, Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-ray Fluorescence Spectrometry, or ASTM D5453-06, Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence (all incorporated by reference under §75.6 of this part). Alternatively, the oil samples may be analyzed for percent sulfur by any consensus standard method prescribed for the affected unit under part 60 of this chapter.

2.2.6 Where the flowmeter records volumetric flow rate rather than mass flow rate, analyze oil samples to determine the density or specific gravity of the oil. Determine the density or specific gravity of the oil sample in accordance with ASTM D287-92 (Reapproved 2000), Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method), ASTM

D1217-93 (Reapproved 1998), Standard Test Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer, ASTM D1481-93 (Reapproved 1997), Standard Test Method for Density and Relative Density (Specific Gravity) of Viscous Materials by Lipkin Bicapillary Pycnometer, ASTM D1480-93 (Reapproved 1997), Standard Test Method for Density and Relative Density (Specific Gravity) of Viscous Materials by Bingham Pycnometer, ASTM D1298-99, Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method, or ASTM D4052-96 (Reapproved 2002), Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter (all incorporated by reference under §75.6 of this part). Alternatively, the oil samples may be analyzed for density or specific gravity by any consensus standard method prescribed for the affected unit under part 60 of this chapter.

2.2.7 Analyze oil samples to determine the heat content of the fuel. Determine oil heat content in accordance with ASTM D240-00, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, ASTM D4809-00, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method), or ASTM D5865-01a, Standard Test Method for Gross Calorific Value of Coal and Coke (all incorporated by reference under §75.6 of this part) or any other procedures listed in section 5.5 of appendix F of this part. Alternatively, the oil samples may be analyzed for heat content by any consensus standard method prescribed for the affected unit under part 60 of this chapter.

2.2.8 Results from the oil sample analysis must be available no later than thirty calendar days after the sample is composited or taken. However, during an audit, the Administrator may require that the results of the analysis be available as soon as practicable, and no later than 5 business days after receipt of a request from the Administrator.

### *2.3 SO<sub>2</sub> Emissions From Combustion of Gaseous Fuels*

(a) Account for the hourly SO<sub>2</sub> mass emissions due to combustion of gaseous fuels for each hour when gaseous fuels are combusted by the unit using the procedures in this section.

(b) The procedures in sections 2.3.1 and 2.3.2 of this appendix, respectively, may be used to determine SO<sub>2</sub> mass emissions from combustion of pipeline natural gas and natural gas, as defined in §72.2 of this chapter. The procedures in section 2.3.3 of this appendix may be used to account for SO<sub>2</sub> mass emissions from any gaseous fuel combusted by a unit. For each type of gaseous fuel, the

## SUBCHAPTER D—WATER PROGRAMS (CONTINUED)

### PART 136—GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS

#### Sec.

136.1 Applicability.

136.2 Definitions.

136.3 Identification of test procedures.

136.4 Application for alternate test procedures.

136.5 Approval of alternate test procedures.

APPENDIX A TO PART 136—METHODS FOR ORGANIC CHEMICAL ANALYSIS OF MUNICIPAL AND INDUSTRIAL WASTEWATER

APPENDIX B TO PART 136—DEFINITION AND PROCEDURE FOR THE DETERMINATION OF THE METHOD DETECTION LIMIT—REVISION 1.11

APPENDIX C TO PART 136—INDUCTIVELY COUPLED PLASMA—ATOMIC EMISSION SPECTROMETRIC METHOD FOR TRACE ELEMENT ANALYSIS OF WATER AND WASTES METHOD 200.7

APPENDIX D TO PART 136—PRECISION AND RECOVERY STATEMENTS FOR METHODS FOR MEASURING METALS

AUTHORITY: Secs. 301, 304(h), 307 and 501(a), Pub. L. 95-217, 91 Stat. 1566, et seq. (33 U.S.C. 1251, et seq.) (the Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

#### § 136.1 Applicability.

The procedures prescribed herein shall, except as noted in § 136.5, be used to perform the measurements indicated whenever the waste constituent specified is required to be measured for:

(a) An application submitted to the Administrator, or to a State having an approved NPDES program for a permit under section 402 of the Clean Water Act of 1977, as amended (CWA), and/or to reports required to be submitted under NPDES permits or other requests for quantitative or qualitative effluent data under parts 122 to 125 of title 40, and,

(b) Reports required to be submitted by discharges under the NPDES established by parts 124 and 125 of this chapter, and,

(c) Certifications issued by States pursuant to section 401 of the CWA, as amended.

[38 FR 28758, Oct. 16, 1973, as amended at 49 FR 43250, Oct. 26, 1984]

#### § 136.2 Definitions.

As used in this part, the term:

(a) *Act* means the Clean Water Act of 1977, Pub. L. 95-217, 91 Stat. 1566, et seq. (33 U.S.C. 1251 et seq.) (The Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

(b) *Administrator* means the Administrator of the U.S. Environmental Protection Agency.

(c) *Regional Administrator* means one of the EPA Regional Administrators.

(d) *Director* means the Director of the State Agency authorized to carry out an approved National Pollutant Discharge Elimination System Program under section 402 of the Act.

(e) *National Pollutant Discharge Elimination System (NPDES)* means the national system for the issuance of permits under section 402 of the Act and includes any State or interstate program which has been approved by the Administrator, in whole or in part, pursuant to section 402 of the Act.

(f) *Detection limit* means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure set forth at appendix B of this part.

[38 FR 28758, Oct. 16, 1973, as amended at 49 FR 43250, Oct. 26, 1984]

#### § 136.3 Identification of test procedures.

(a) Parameters or pollutants, for which methods are approved, are listed together with test procedure descriptions and references in Tables IA, IB, IC, ID, IE, and IF. The full text of the referenced test procedures are incorporated by reference into Tables IA, IB, IC, ID, IE, and IF. The incorporation by reference of these documents, as specified in paragraph (b) of this section, was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed in paragraph (b) of

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this section. Information regarding obtaining these documents can be obtained from the EPA Office of Water Statistics and Analytical Support Branch at 202-566-1000. Documents may be inspected at EPA's Water Docket, EPA West, 1301 Constitution Avenue, NW., Room B135, Washington, DC (Telephone: 202-566-2426); or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC. These test procedures are incorporated as they exist on the day of approval and a notice of any change in these test procedures will be published in the **FEDERAL REGISTER**. The discharge parameter values for which reports are required must be determined by one of the standard analyt-

ical test procedures incorporated by reference and described in Tables IA, IB, IC, IE, and IF, or by any alternate test procedure which has been approved by the Administrator under the provisions of paragraph (d) of this section and §§136.4 and 136.5. Under certain circumstances (paragraph (b) or (c) of this section or 40 CFR 401.13) other test procedures may be more advantageous when such other test procedures have been previously approved by the Regional Administrator of the Region in which the discharge will occur, and providing the Director of the State in which such discharge will occur does not object to the use of such alternate test procedure.

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TABLE IA—LIST OF APPROVED BIOLOGICAL METHODS

| Parameter and units  | Method <sup>1</sup>   | EPA                 | Standard Methods<br>18th, 19th, 20th<br>ed. | ASTM  | USGS                   |
|--|---|---------------------|---|-------|------------------------|
| Bacteria <sup>a</sup> :  |   |                     |   |       |                        |
| 1. Coliform (fecal), number per 100 mL .....   | Most Probable Number (MPN), 5 tube 3 dilution, or Membrane filter (MF) + single step .... | P. 123 <sup>4</sup> | 9221C E <sup>4</sup>                        | ..... | .....                  |
| 2. Coliform (fecal) in presence of chlorine, number per 100 mL .....   | MPN, 5 tube, 3 dilution, or MF, single step 6 .....                                       | P. 124 <sup>4</sup> | 9222D <sup>4</sup>                          | ..... | B-0050-95 <sup>5</sup> |
| 3. Coliform (total), number per 100 mL .....   | MPN, 5 tube, 3 dilution, or MF 2 single step or two step ....                             | P. 123 <sup>4</sup> | 9221C E <sup>4</sup>                        | ..... | .....                  |
| 4. Coliform (total), in presence of chlorine, number per 100 mL .....  | MPN, 5 tube, 3 dilution, or MF 2 with enrichment ....                                     | P. 114 <sup>3</sup> | 9221D <sup>4</sup>                          | ..... | .....                  |
| 5. Fecal streptococci, number per 100 mL .....   | MPN, 5 tube, 3 dilution .....   | P. 108 <sup>3</sup> | 9222B <sup>4</sup>                          | ..... | .....                  |
| Aquatic Toxicity:  |   |                     |   |       |                        |
| 6. Toxicity, acute, fresh water organisms, LC50, percent effluent.   | MF 2, with enrichment ....  | P. 114 <sup>3</sup> | 9221B <sup>4</sup>                          | ..... | .....                  |
| 7. Toxicity, acute, estuarine and marine organisms of the Atlantic Ocean and Gulf of Mexico, LC50, percent effluent.           | MF 2, with enrichment ....  | P. 139 <sup>3</sup> | 9222 (B+B-5C) <sup>4</sup>                  | ..... | .....                  |
| 8. Toxicity, chronic, fresh water organisms, NOEC or IC25, percent effluent.   | MF 2, with enrichment ....  | P. 138 <sup>3</sup> | 9230B <sup>4</sup>                          | ..... | .....                  |
| 9. Toxicity, chronic, estuarine and marine organisms of the Atlantic Ocean and Gulf of Mexico, NOEC or IC25, percent effluent. | MF 2, with enrichment ....  | P. 143 <sup>3</sup> | 9230C <sup>4</sup>                          | ..... | .....                  |
|  | Plate count .....   | 72002.0             | 72021.0                                     | ..... | .....                  |
|  | Centrodoaphnia dubia acute .....  | 72002.0             | 72021.0                                     | ..... | .....                  |
|  | Daphnia pulex and Daphnia magna acute .....   | 72001.0             | 72021.0                                     | ..... | .....                  |
|  | Fathead minnow, Pimephales promelas, and Banggai stinger, Cyprinella ledisi, acute .....  | 72019.0             | 72019.0                                     | ..... | .....                  |
|  | Rainbow trout, Oncorhynchus mykiss, and brook trout, Salvelinus fontinalis, acute .....   | 72007.0             | 72004.0                                     | ..... | .....                  |
|  | Mysid, Mysidopsis bahia, acute .....  | 72006.0             | 72006.0                                     | ..... | .....                  |
|  | Sheepshead minnow, Cyprinodon variegatus, acute .....                                     | 72001.0             | 72001.0                                     | ..... | .....                  |
|  | Silverside, Menidia peninsulae, acute .....   | 72003.0             | 72003.0                                     | ..... | .....                  |
|  | Menidia peninsulae, acute .....   | 72004.0             | 72004.0                                     | ..... | .....                  |
|  | Fathead minnow, Pimephales promelas, larval survival and growth .....                     | 91000.0             | 91000.0                                     | ..... | .....                  |
|  | Fathead minnow, Pimephales promelas, embryonal survival and teratogenicity .....          | 91001.0             | 91001.0                                     | ..... | .....                  |
|  | Dephinia, Ceriodaphnia dubia, survival and reproduction .....                             | 91002.0             | 91002.0                                     | ..... | .....                  |
|  | Green alga, Selenastrum capricornutum, growth .....                                       | 91003.0             | 91003.0                                     | ..... | .....                  |
|  | Sheepshead minnow, Cyprinodon variegatus, larval survival and growth .....                | 91004.0             | 91004.0                                     | ..... | .....                  |
|  | Inland silverside, Menidia beryllina, larval survival and growth .....                    | 91005.0             | 91005.0                                     | ..... | .....                  |
|  | Mysidopsis bahia, survival, growth, and fecundity .....                                   | 91006.0             | 91006.0                                     | ..... | .....                  |
|  | Sea urchin, Arbacia punctulata, fertilization .....                                       | 91007.0             | 91007.0                                     | ..... | .....                  |
|  | .....   | 91008.0             | 91008.0                                     | ..... | .....                  |

Notes to Table IA:

1 The method must be specified when results are reported.

2 A 0.45 µm membrane filter (MF) or other pore size certified by the manufacturer to fully retain organisms to be cultivated and to be free of extractables which could interfere with their growth.

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<sup>3</sup> USEPA, 1978. Microbiological Methods for Monitoring the Environment, Water, and Wastes. Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio. EPA/600/8-78/017.

<sup>4</sup> APHA, 1998, 1995, 1992. Standard Methods for the Examination of Water and Wastewater. American Public Health Association, 20th, 19th, and 18th Editions. Amer. Publ. Hlth. Assoc., Washington, DC.

<sup>5</sup> USGS, 1889. U.S. Geological Survey Techniques of Water-Resource Investigations, Book 5, Laboratory Analysis, Chapter A4, Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples U.S. Geological Survey, U.S. Department of the Interior, Reston, Virginia.

<sup>6</sup> Because the MF technique usually yields low and variable recovery from chlorinated wastewater, the Most Probable Number method will be required to resolve any controversies.

<sup>7</sup> USEPA, October 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 821-R-02-012.

<sup>8</sup> USEPA, October 2002. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 821-R-02-013.

<sup>9</sup> USEPA, October 2002. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. Third Edition. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 821-R-02-014.

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES

| Parameter, units and method  | EPA 1.35                                  | Standard Methods [Edition(s)]   | ASTM                                      | Reference (method number or page) | USGS <sup>2</sup>                          | Other   |
|--|---|---|---|-----------------------------------|--|---------|
| 1. Acidity, as $\text{CaCO}_3$ , mg/L; Electrolytic endpoint or phenolphthalein endpoint.  | 305.1                                     | 2310 B [4a] [18th, 19th, 20th],<br>2320 B [18th, 19th, 20th] ...  | D1067-92                                  | I-1020-85<br>I-2030-85            | 973.43 <sup>3</sup>                        |         |
| 2. Alkalinity, as $\text{CaCO}_3$ , mg/L; Electrometric or Colorimetric titration to pH 4.5, manual or automatic.  | 310.1                                     | 2320 B [18th, 19th, 20th] ...   | D1067-92                                  | I-1030-85<br>I-2030-85            |  |         |
| 3. Aluminum—Total, <sup>4</sup> mg/L; Digestion followed by: AA direct aspiration <sup>5</sup> ...   | 310.2                                     | 3111 D [18th, 19th] ...<br>3120 B [18th, 19th, 20th] ...  | I-3051-85<br>I-4471-97 <sup>6</sup>       |                                   |  |         |
| AA direct aspiration <sup>5</sup> ...<br>AA furnace Inductively Coupled Plasma/Atomic Emission Spectrometry (ICP/AES) <sup>7</sup> ...   | 202.1                                     | 3120 B [18th, 19th, 20th] ...   | D4190-94                                  |                                   |  |         |
| 4. Ammonia (as N), mg/L; Manual, distillation (at pH 9.5) <sup>8</sup> followed by: Nesslerization ...<br>Titration ...<br>Electrode ...<br>Automated phenate, or<br>Automated electrode | 350.2<br>350.2<br>350.2<br>350.3<br>350.1 | 3500-AI B [20th] and<br>3500-AI D [18th, 19th],<br>4500-NH <sub>3</sub> B [18th, 19th,<br>20th],<br>4500-NH <sub>3</sub> C [18th] ...<br>4500-NH <sub>3</sub> C [19th, 20th],<br>and 4500-NH <sub>3</sub> E [18th],<br>4500-NH <sub>3</sub> D or E [19th,<br>20th] and 4500-NH <sub>3</sub> F or<br>G [18th],<br>4500-NH <sub>3</sub> G [19th, 20th],<br>and 4500-NH <sub>3</sub> H [18th]. | D1426-98(A)<br>D1426-98(B)<br>D1426-98(B) | I-3520-85<br>I-4523-85            | 973.49 <sup>3</sup><br>973.49 <sup>3</sup> | Note 7. |

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|   |   |  |
|---|---|--|
| 5. Antimony—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>36</sup> .....<br>AA furnace .....<br>ICP/AES <sup>36</sup> .....<br>204.1 .....<br>204.2 .....<br>200.7 <sup>5</sup> .....  | 3111 B [18th, 19th]<br>3113 B [18th, 19th] .....<br>3120 B [18th, 19th] .....   | D2872-97(B)<br>D2872-97(C)<br>D2872-97(A)  |
| 6. Arsenic—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA gaseous hydride .....<br>AA furnace .....<br>ICP/AES <sup>36</sup> or<br>Colorimetric (SDOC) .....<br>206.5 .....<br>206.3 .....<br>206.2 .....<br>200.7 <sup>5</sup> .....  | 3114 B-d [18th, 19th]<br>3113 B [18th, 19th] .....<br>3120 B [18th, 19th] .....<br>3500-As B [20th] and<br>3500-As C [18th, 19th],<br>3111 D [18th, 19th] .....<br>3113 B [18th, 19th] .....<br>3120 B [18th, 19th] ..... | I-3062-85<br>I-4063-98 <sup>49</sup><br>I-3060-85  |
| 7. Barium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>14</sup> .....<br>AA furnace .....<br>ICP/AES <sup>14</sup> .....<br>DCP <sup>14</sup> .....<br>208.1 .....<br>208.2 .....<br>200.7 <sup>5</sup> .....   | 3111 D [18th, 19th] .....<br>3113 B [18th, 19th] .....<br>3120 B [18th, 19th] .....   | I-3084-85<br>D4382-95  |
| 8. Beryllium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration .....<br>AA furnace .....<br>ICP/AES .....<br>DCP or<br>Colorimetric (aluminum demand) .....<br>210.1 .....<br>210.2 .....<br>200.7 <sup>5</sup> .....   | 3111 D [18th, 19th] .....<br>3113 B [18th, 19th] .....<br>3120 B [18th, 19th] .....<br>3500-Be D [18th, 19th] .....   | I-3095-85<br>D3845-93(8)(A)<br>D3845-93(8)(B)<br>D4190-94  |
| 9. Biochemical oxygen demand (BOD <sub>x</sub> ), mg/L; Dissolved Oxygen Depletion .....<br>10. Boron—Total, mg/L; Colorimetric (curcumin) .....<br>DCP .....<br>205.1 .....<br>212.3 .....<br>200.7 <sup>5</sup> .....   | 5210 B [18th, 20th] .....<br>4500-B B [18th, 19th, 20th]<br>3120 B [18th, 19th, 20th] .....   | I-1578-78 <sup>4</sup> .....   |
| 11. Bromide, mg/L; Titrimetric .....<br>12. Cadmium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>36</sup> .....<br>AA furnace .....<br>ICP/AES <sup>36</sup> .....<br>DCP <sup>36</sup> .....<br>213.1 .....<br>213.2 .....<br>200.7 <sup>5</sup> ..... | 3111 B or C [18th, 19th] .....<br>3113 B [18th, 19th] .....<br>3120 B [18th, 19th] .....<br>3500-Cd D [18th, 19th],<br>3111 B [18th, 19th] .....<br>3120 B [18th, 20th] .....   | I-3135-85 or<br>I-4138-88 <sup>51</sup><br>I-1472-85 or<br>D4190-94<br>D3557-95(C),<br>D3557-95(D) ..... |
| 13. Calcium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration .....<br>ICP/AES .....<br>DCP, or<br>Titrimetric (EDTA) .....<br>215.1 .....<br>200.7 <sup>5</sup> .....  | 3111 B [18th, 19th] .....<br>3120 B [18th, 19th, 20th] .....  | I-3152-85<br>I-4712-97 <sup>50</sup>   |
| 14. Carbonaceous biochemical oxygen demand (CBOD <sub>3</sub> ), mg/L <sub>12</sub> ;   | 3500-Ca B [20th] and<br>3500-Ca D [18th, 19th],<br>215.2 .....  | D511-93(A),<br>Note 34.  |

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TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

| Parameter, units and method   | EPA 1. <sup>35</sup>             | Standard Methods [Editions]  | ASTM <sup>1</sup>  | USGS <sup>2</sup>  | Other  | Reference (method number or page)       |
|---|----------------------------------|--|--|--|--|---|
| Dissolved Oxygen Depletion with nitrification inhibitor, 15. Chemical oxygen demand (COD), mg/L; Trinitrophenic or Spectrophotometric, manual or automatic. | 410.1<br>410.2<br>410.3<br>410.4 | 5210 B [18th, 19th, 20th];<br>5220 C [18th, 19th, 20th];<br>5220 D [18th, 19th, 20th];<br>.....  | D1252-95(A)<br>.....<br>D1252-95(B)<br>.....               | I-3560-85<br>.....<br>I-3562-85<br>.....<br>I-3561-85<br>.....     | .....<br>.....<br>.....<br>.....                   | 973.46, <sup>3</sup> p. 17 <sup>9</sup> |
| 16. Chloride, mg/L; Trinitrophenic (silver nitrate) or (Mercuric nitrate) or Colorimetric, manual or Automated (Fericyanide)                                | 325.3                            | 4500-Cl-B [18th, 19th, 20th];<br>4500-Cl-C [18th, 19th, 20th];<br>.....<br>4500-Cl-E [18th, 19th, 20th];<br>.....  | D512-89(A)<br>.....<br>.....<br>.....<br>.....             | I-1183-85<br>.....<br>I-1184-85<br>.....<br>I-1187-85<br>I-2187-85 | .....<br>.....<br>.....<br>.....<br>.....          | Notes 13, 14.<br>973.51 <sup>3</sup>    |
| 17. Chlorine—Total residual, mg/L; Trinitrophenic; Amperometric direct; Iodometric direct   | 330.1<br>330.3                   | 4500-Cl-D [18th, 19th, 20th];<br>4500-Cl-B [18th, 19th, 20th];<br>4500-Cl-C [18th, 19th, 20th];<br>4500-Cl-F [18th, 19th, 20th];<br>4500-Cl-G [18th, 19th, 20th];<br>..... | D1253-86(92);<br>.....<br>.....<br>.....<br>.....<br>..... | .....<br>.....<br>.....<br>.....<br>.....<br>.....                 | .....<br>.....<br>.....<br>.....<br>.....<br>..... | .....                                   |
| 18. Back titration, either end-point 1s or, DPD-FAS   | 330.2<br>330.4                   | .....<br>330.2<br>.....<br>330.4   | .....<br>.....<br>.....                                    | .....<br>.....<br>.....  | .....<br>.....<br>.....                            | Note 16.                                |
| 19. Spectrophotometric, DPD   | 330.5                            | .....  | .....  | .....  | .....  | .....                                   |
| Or Electrode  | .....                            | .....  | .....  | .....  | .....  | .....                                   |
| 18. Chromium VI dissolved, mg/L; 0.05 micron filtration followed by: A) chelation-extraction or Colorimetric (Diphenylcarbazide)                            | 218.4                            | 3111 C [18th, 19th];<br>3500-Cr-B [20th] and<br>3500-Cr-D [18th, 19th];<br>.....   | D1687-92(A)<br>.....                                       | I-1232-85<br>I-1230-85   | .....<br>.....                                     | .....                                   |
| 19. Chromium—Total, <sup>4</sup> mg/L; Digestion followed by: A) direct aspiration <sup>36</sup>  | 218.1                            | 3111 B [18th, 19th];<br>.....  | D1687-92(B)<br>.....                                       | I-3236-85<br>.....   | .....<br>.....                                     | 974.27 <sup>3</sup>                     |
| A) chelation-extraction   | 218.2                            | 3111 C [18th, 19th];<br>.....  | D1687-92(C)<br>.....                                       | I-3233-93 <sup>4b</sup><br>.....                                   | .....<br>.....                                     | .....                                   |
| ICP-AES <sup>36</sup>   | 200.7 <sup>5</sup>               | 3113 B [18th, 19th];<br>3120 B [18th, 19th, 20th];<br>.....  | D4190-94<br>.....  | .....<br>.....   | .....<br>.....                                     | .....                                   |
| DPD <sup>36</sup> or Colorimetric (Diphenylcarbazide)   | .....                            | 3500-Cr-B [20th] and<br>3500-Cr-D [18th, 19th];<br>.....   | .....<br>.....   | .....<br>.....   | .....<br>.....                                     | Note 34.                                |

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|--|--------------------------------------|------------------------------------|------------------------|
| 20. Cobalt—Total, $\text{mg/L}$ : Digestion <sup>4</sup> followed by:  | 3111 B or C [18th, 19th] .....       | I-3239-85 .....                    | p. 379                 |
| AA direct aspiration .....   | 3113 B [18th, 19th] .....            | I-3243-89 <sup>51</sup> .....      |                        |
| AA furnace .....   | 3120 B [18th, 19th, 20th] .....      | I-4471-97 <sup>50</sup> .....      |                        |
| ICP/AES .....  | .....                                | .....                              | Note 34.               |
| DCP .....  | .....                                | .....                              |                        |
| 21. Color: platinum cobalt units or dominant wavelength, hue, luminescence purity:   | 3111 B or C [18th, 19th] .....       | I-3239-85(A or B) .....            |                        |
| Colorimetric (ADM), or (Platinum cobalt), or Spectrophotometric .....  | 3113 B [18th, 19th] .....            | D3558-94(C) .....                  |                        |
| DCP .....  | 3120 B [18th, 19th, 20th] .....      | D3558-94 .....                     |                        |
| 22. Copper—Total, $\text{mg/L}$ : Digestion <sup>4</sup> followed by:  | 3111 B or C [18th, 19th] .....       | I-3238-95(A or B) .....            |                        |
| AA direct aspiration .....   | 3113 B [18th, 19th] .....            | D1688-95(C) .....                  |                        |
| AA furnace .....   | 3120 B [18th, 19th, 20th] .....      | D1688-95 .....                     |                        |
| ICP/AES .....  | .....                                | .....                              |                        |
| DCP <sup>52</sup> or .....   | .....                                | .....                              |                        |
| Colorimetric (Neocuproine) or (Bicinchoninate) .....   | 3110-94 .....                        | .....                              |                        |
| .....  | .....                                | .....                              |                        |
| 23. Cyanide—Total, $\text{mg/L}$ : Manual distillation with $\text{MgCl}_2$ followed by:                                       | 3111 B or C [18th, 19th, 20th] ..... | D2036-98(A) .....                  |                        |
| Titrimetric, or .....  | 4500-CN D [18th, 19th, 20th] .....   | .....                              |                        |
| Spectrophotometric, manual or .....  | 4500-CN E [18th, 19th, 20th] .....   | D2036-98(A) .....                  |                        |
| Automated .....  | .....                                | .....                              |                        |
| 24. Available Cyanide, $\text{mg/L}$ : Manual distillation with $\text{MgCl}_2$ followed by titrimetric or Spectrophotometric. | 335.2 <sup>31</sup> .....            | 4500-CN G [18th, 19th, 20th] ..... |                        |
| Flow injection and ligand exchange, followed by amperometry.   | 335.3 <sup>31</sup> .....            | D2036-98(B) .....                  |                        |
| 25. Fluoride—Total, $\text{mg/L}$ : Manual distillation <sup>6</sup> followed by Electrode, manual or .....                    | 4500-F B [18th, 19th, 20th] .....    | 4500-F B [18th, 19th, 20th] .....  |                        |
| Automated .....  | 4500-F C [18th, 19th, 20th] .....    | D1179-93(B) .....                  |                        |
| Colorimetric (SPADNS) .....  | 4500-F D [18th, 19th, 20th] .....    | D1179-93(A) .....                  |                        |
| Or Automated complexone .....  | 4500-F E [18th, 19th, 20th] .....    | .....                              |                        |
| 26. Gold—Total, $\text{mg/L}$ : Digestion <sup>4</sup> followed by:  | 3111 B [18th, 19th] .....            | .....                              | OIA-1677 <sup>44</sup> |
| AA direct aspiration .....   | .....                                | .....                              |                        |
| AA furnace .....   | .....                                | .....                              |                        |
| DCP .....  | .....                                | .....                              |                        |

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TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

| Parameter, units and method  | EPA <sup>1,3,5</sup>  | Standard Methods [Edition(s)]  | ASTM                  | USGS <sup>2</sup>      | Other | Reference (method number or page) |
|--|---|--|-----------------------|------------------------|-------|-----------------------------------|
| 27. Hardness—Total as $\text{CaCO}_3$ , mg/L                                       | 130.1<br>Automated colorimetric, Titrimetric (EDTA), or Ca plus Mg as their carbonates, by inductively coupled plasma or AA direct aspiration (See Parameters 13 and 33). | 2340 B or C [18th, 19th, 20th].  | D1126-86(92)          | I-1338-85              | ..... | 973.52B,<br>973.52                |
| 28. Hydrogen ion (pH), pH units: Electrometric measurement, or Automated electrode | 150.1   | 4500-H <sup>+</sup> B [18th, 19th, 20th].                                  | D1293-84 (90)(A or B) | I-1586-85              | ..... | 973.41,<br>Note 21.               |
| 29. Indium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:           | 235.1   | 3111 B [18th, 19th]  | .....                 | I-2587-85              | ..... | .....                             |
| AA direct aspiration or AA furnace   | 235.2   | .....  | .....                 | .....                  | ..... | .....                             |
| 30. Iron—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:             | 236.1   | 3111 B or C [18th, 19th]   | D1068-86(A or B)      | I-3381-85              | ..... | 974.27,<br>974.27                 |
| AA direct aspiration   | 236.2   | 3113 B [18th, 19th]  | D1068-96(C)           | .....                  | ..... | .....                             |
| AA furnace   | 200.7 <sup>6</sup>  | 3120 B [18th, 19th, 20th]  | D4190-94              | I-471-97 <sub>40</sub> | ..... | .....                             |
| ICP/AES <sup>6</sup>   | .....   | 3500-Fe B [20th] and 3500-Fe D [18th, 19th].                               | D1068-96(D)           | .....                  | ..... | .....                             |
| DCP <sup>6</sup> or Colometric (Phenanthroline)                                    | .....   | 4500-N <sub>rx</sub> B or C and 4500-NH <sub>3</sub> B [18th, 19th, 20th]. | D3590-89(A)           | .....                  | ..... | .....                             |
| 31. Kjeldahl Nitrogen—Total, (as N), mg/L; Digestion and distillation followed by: | 351.3   | 4500-N <sub>rx</sub> B or C [18th, 19th, 20th].                            | D3590-89(A)           | .....                  | ..... | 973.48 <sup>3</sup>               |
| Titration  | 351.3   | 4500-NH <sub>3</sub> C [18th]  | D3590-89(A)           | .....                  | ..... | .....                             |
| Nesslerization   | 351.3   | 4500-NH <sub>3</sub> C [18th, 20th]  | D3590-89(A)           | .....                  | ..... | .....                             |
| Electrode  | 351.3   | 4500-NH <sub>3</sub> E [18th]  | D3590-89(B)           | .....                  | ..... | .....                             |
| Automated phenate colorimetric, Semi-automated block digester colorimetric.        | 351.1   | .....  | .....                 | .....                  | ..... | .....                             |
| Manual or block digester colorimetric.   | 351.2   | .....  | .....                 | .....                  | ..... | .....                             |
| Block digester followed by Auto distillation and Titration, or Nesslerization, or  | 351.4   | .....  | .....                 | .....                  | ..... | .....                             |
| Flow injection gas diffusion   | .....   | .....  | .....                 | .....                  | ..... | .....                             |

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|--|---|--|--|--|----------|
| 32. Lead—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>36</sup> .....<br>AA furnace .....<br>ICP/AES <sup>36</sup> .....<br>DCP <sup>36</sup> .....<br>Volatometry <sup>11</sup> or<br>Colorimetric (Dithizone) ..... | 299.1 .....<br>299.2 .....<br>200.7 <sup>5</sup> .....  | 3111 B or C [18th, 19th]<br>3113 B [18th, 19th]<br>3120 B [18th, 19th, 20th] ..... | D3559-96(A or B) .....<br>D3559-96(D) .....<br>D4190-94 .....<br>D3558-96(C) ..... | 974.27 <sup>3</sup> .....<br>I-3395-85 .....<br>I-4403-89 <sup>51</sup> .....<br>I-4471-97 <sup>50</sup> ..... | Note 34. |
| 33. Magnesium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>36</sup> .....<br>ICP/AES .....<br>DCP or<br>Gravimetric .....  | 242.1 .....<br>200.7 <sup>5</sup> .....                 | 3111 B [18th, 19th]<br>3120 B [18th, 19th, 20th] .....                             | D511-93(E) .....<br>D511-93(F) .....   | 974.27 <sup>3</sup> .....<br>I-3447-95 .....<br>I-4471-97 <sup>50</sup> .....                                  | Note 34. |
| 34. Manganese—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>36</sup> .....<br>AA furnace .....<br>ICP/AES <sup>36</sup> .....<br>DCP <sup>36</sup> , or<br>Colorimetric (Pensulatite), or<br>(Perodate) .....         | 243.1 .....<br>243.2 .....<br>200.7 <sup>5</sup> .....  | 3111 B [18th, 19th]<br>3113 B [18th, 19th] .....                                   | D658-95(A or B) .....<br>D658-95(C) .....  | 974.27 <sup>3</sup> .....<br>I-3454-85 .....<br>I-4471-97 <sup>50</sup> .....                                  | Note 34. |
| 35. Mercury—Total, <sup>4</sup> mg/L;<br>Cold vapor, manual or<br>Automated .....<br>Oxidation, purge and trap, and<br>cold vapor atomic fluorescence<br>spectrometry (ng/L),  | 25.1 .....<br>25.2 .....<br>163.1E-4 <sup>3</sup> ..... | 3112 B [18th, 19th] .....  | D4190-94 .....<br>D3223-91 .....   | 920.203 <sup>3</sup> .....<br>I-3462-85 .....  | Note 23. |
| 36. Molybdenum—Total, <sup>4</sup> , mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>36</sup> .....<br>AA furnace .....<br>ICP/AES .....<br>DCP .....   | 246.1 .....<br>246.2 .....<br>200.7 <sup>5</sup> .....  | 3111 D [18th, 19th]<br>3113 B [18th, 19th] .....                                   | I-3490-85 .....<br>I-3492-86 <sup>47</sup> .....<br>I-4471-97 <sup>50</sup> .....  | I-3490-85 .....<br>I-3492-86 <sup>47</sup> .....<br>I-4471-97 <sup>50</sup> .....                              | Note 34. |
| 37. Nickel—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration <sup>36</sup> .....<br>AA furnace .....<br>ICP/AES <sup>36</sup> .....<br>DCP, or<br>Colorimetric (hexoimine) .....   | 249.1 .....<br>249.2 .....<br>200.7 <sup>5</sup> .....  | 3111 B or C [18th, 19th]<br>3113 B [18th, 19th] .....                              | D1886-90(A or B) .....<br>D1886-90(C) .....  | 973.50, <sup>3</sup> 419D, <sup>17</sup> p. 28 <sup>9</sup> .....  | Note 34. |
| 38. Nitrate (as N), mg/L;<br>Colorimetric (Boridine sulfate), or<br>Nitrate-nitrite N minus Nitrite N<br>(See parameters 39 and 40).<br>39. Nitrate-nitrite (as N),<br>mg/L .....  | 352.1 .....   | 3500-Ni D [17th].  | D4190-94 .....   | 973.50, <sup>3</sup> 419D, <sup>17</sup> p. 28 <sup>9</sup> .....  |          |

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TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

| Parameter, units and method   | EPA <sup>1,35</sup>       | Standard Methods [Edition(s)]                 | ASTM                    | USGS <sup>2</sup>        | Other | Reference (method number or page)          |
|---|---------------------------|---|-------------------------|--------------------------|-------|--|
| Cadmium reduction, Manual or ..   | 353.3 .....               | 4500-HNO <sub>3</sub> - E [18th, 19th, 20th]. | D3867-90(B).            |                          |       |  |
| Automated, or .....   | 353.2 .....               | 4500-HNO <sub>3</sub> - F [18th, 19th, 20th]. | D3867-90(A) .....       |                          |       | I-454-85.                                  |
| Automated hydrazine .....   | 353.1 .....               | 4500-HNO <sub>3</sub> - H [18th, 19th, 20th]. |                         |                          |       |  |
| 40. Nitrite (as N), mg/L; Spectrophotometric; Manual or .....   | 354.1 .....               | 4500-HNO <sub>3</sub> - B [18th, 19th, 20th]. |                         |                          |       | Note 25.                                   |
| Automated (Diazotization) .....   | .....                     | .....   | .....                   | .....                    | ..... | I-454-85.                                  |
| 41. Oil and grease—Total recoverable, mg/L;   | 413.1 .....               | 5520B [18th, 19th, 20th] <sup>38</sup> .      |                         |                          |       | 973.47, <sup>3</sup> p. 14 <sup>24</sup> . |
| Gravimetric (extraction) .....  | 1664A <sup>42</sup> ..... | 5520B [18th, 19th, 20th] <sup>38</sup> .      |                         |                          |       |  |
| Oil and grease and non-polar material, mg/L; Hexane extractable material (HEM): n-hexane extraction and gravimetry. | 1664A <sup>42</sup> ..... | .....   |                         |                          |       |  |
| Silica gel treated HEM (SGT-HEM): Silica gel treatment and gravimetry.  | 1664A <sup>42</sup> .     | .....   |                         |                          |       |  |
| 42. Organic carbon—Total (TOC), mg/L; Combustion or oxidation .....   | 415.1 .....               | 5310 B, C, or D [18th, 19th, 20th].           | D2579-93 (A or B) ..... |                          |       |  |
| 43. Organic nitrogen (as N), mg/L; Total Kjeldahl N (Parameter 31) minus ammonia N (Parameter 4).                   | .....                     | .....   |                         |                          |       |  |
| 44. Orthophosphate (as P), mg/L; Ascorbic acid method:  | .....                     | 4500-P F [18th, 19th, 20th]                   | I-4601-85 .....         |                          |       | 973.56 <sup>3</sup>                        |
| Automated, or .....   | 365.1 .....               | 4500-P E [18th, 19th, 20th]                   |                         |                          |       | 973.55 <sup>3</sup>                        |
| Manual single reagent .....   | 365.2 .....               |   |                         |                          |       |  |
| Manual two reagent .....  | 365.3 .....               |   |                         |                          |       |  |
| 45. Osmium—Total*, mg/L; Digestion* followed by:  | 252.1 .....               | 3111 D [18th, 19th].                          |                         |                          |       |  |
| AA direct aspiration, or .....  | 252.2 .....               |   |                         |                          |       |  |
| AA furnace .....  |                           |   |                         |                          |       |  |
| 46. Oxygen dissolved, mg/L; Winkler (Azide modification), or Electrode .....  | 360.2 .....               | 4500-O C [18th, 19th, 20th]                   | D688-92(A) .....        | I-1575-78 <sup>e</sup>   |       |  |
|   | 360.1 .....               | 4500-O G [18th, 19th, 20th].                  | D688-92(B) .....        | I-1576-78 <sup>e</sup> . |       | 973.45B <sup>3</sup>                       |

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|--|--|--|--|
| 47. Palladium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration, or<br>AA furnace<br>DCP                           | 253.1<br>253.2                                 | 3111 B [18th, 19th]  | P. S27 <sup>10</sup><br>P. S28 <sup>10</sup><br>Note 34. |
| 48. Phenols, mg/L;<br>Manual distillation <sup>28</sup><br>Followed by:<br>Colorimetric (AAP) manual,<br>or,<br>Automated <sup>19</sup> ...            | 420.1<br>420.2.                                | .....  | Note 27.   |
| 49. Phosphorus (elemental), mg/L;<br>Gas-liquid chromatography   | 365.2  | 4500-P B, 5 [18th, 19th,<br>20th],<br>4500-P E [18th, 19th, 20th]<br>4500-P F [18th, 19th, 20th]             | 973.55 <sup>3</sup>                                      |
| 50. Phosphorus—Total, mg/L;<br>Persulfate digestion followed by<br>Manual or<br>Automated ascorbic acid reduc-<br>tion.                                | 365.2 or 365.3<br>365.1                        | D515-88(A)<br>D515-88(B)   | 973.56 <sup>3</sup>                                      |
| 51. Platinum—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration<br>AA furnace<br>DCP                                | 365.4  | 3111 B [18th, 19th],<br>.....  | I-4610-91 <sup>48</sup> .<br>Note 34                     |
| 52. Potassium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration<br>ICP/ES<br>Flame photometric, or<br>Colorimetric | 255.1<br>255.2.<br>258.1<br>200.7 <sup>5</sup> | 3111 B [18th, 19th],<br>3120 B [18th, 19th, 20th],<br>3500-K B [20th] and 3500-<br>KD [18th, 19th].<br>..... | I-3830-85<br>973.53 <sup>3</sup>                         |
| 53. Residue—Total, mg/L;<br>Gravimetric, 103–105 <sup>6</sup><br>54. Residue—filterable, mg/L;<br>Gravimetric, 180 <sup>6</sup> ...                    | 160.3<br>160.1                                 | 2540 B [18th, 19th, 20th]<br>2540 C [18th, 19th, 20th]   | I-3750-85.<br>I-1750-85.                                 |
| 55. Residue—nonfilterable (TSS),<br>mg/L<br>Gravimetric, 103–105 <sup>6</sup> post<br>washing of residue.  | 160.2  | 2540 D [18th, 19th, 20th]  | I-3765-85.   |
| 56. Residue—settable, mg/L;<br>Volumetric, (imhoff cone), or<br>Gravimetric.   | 160.5  | 2540 F [18th, 19th, 20th].   | .....  |
| 57. Residue—Volatile, mg/L;<br>Gravimetric, 550 <sup>6</sup> ...   | 160.4  | .....  | I-3753-85.   |
| 58. Rhodium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration, or<br>AA furnace                                    | 265.1<br>265.2.                                | 3111 B [18th, 19th].   | .....  |

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TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

| Parameter, units and method   | EPA 1.3 <sup>15</sup>                      | Standard Methods [Edition(s)]  | ASTM              | USGS <sup>2</sup>                               | Other | Reference (method number or page)                     |
|---|--|--|-------------------|---|-------|---|
| 59. Ruthenium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration, or<br>AA furnace                       | 267.1<br>267.2.....                        | 3111 B [18th, 19th].   | D3859-98(B) ..... | D3859-98(A) .....                               | ..... | .....   |
| 60. Selenium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA furnace<br>ICP/AES, <sup>36</sup> or<br>AA gaseous hydride | 270.2<br>200.7 <sup>5</sup> .....          | 3113 B [18th, 19th] .....  | D3859-98(B) ..... | D3859-98(A) .....                               | ..... | I-4669-98- <sup>49</sup> .<br>I-3667-85.              |
| 61. Silica <sup>37</sup> —Dissolved, mg/L; 0.45 micron filtration followed by:<br>Colorimetric, Manual or<br>ICP                            | 370.1<br>200.7 <sup>5</sup> .....          | 4500-SiO <sub>2</sub> C [20th] and<br>4500-Si D [18th, 19th].<br>3120 B [18th, 19th, 20th] ..... | D859-94 .....     | .....   | ..... | I-1700-85.<br>I-2700-85.<br>I-4471-97 <sup>50</sup> . |
| 62. Silver—Total, <sup>4</sup> mg/L; Digestion <sup>4,39</sup> followed by:<br>AA direct aspiration<br>AA furnace<br>ICP/AES                | 272.1<br>272.2<br>200.7 <sup>5</sup> ..... | 3111 B or C [18th, 19th] .....   | .....             | .....   | ..... | 974,27, <sup>3</sup> p. 37 <sup>9</sup> .             |
| 63. DCP.....  | .....                                      | 3113 B [18th, 19th] .....  | .....             | .....   | ..... | .....   |
| 63. Sodium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:<br>AA direct aspiration<br>AA furnace<br>ICP/AES                   | 273.1<br>200.7 <sup>5</sup> .....          | 3120 B [18th, 19th, 20th] .....  | .....             | 3500 Na B [20th] and 3500<br>Na D [18th, 19th]. | ..... | I-3735-85 .....                                       |
| 64. Specific conductance, microhos/cm at 25 °C;<br>Wheatstone bridge  | 120.1.....                                 | 2510 B [18th, 19th, 20th] .....  | D1125-95(A) ..... | .....   | ..... | I-4471-97 <sup>50</sup> .....                         |
| 65. Sulfate (as SO <sub>4</sub> ), mg/L;<br>Automated colorimetric (barium<br>chloranilate).<br>Gravimetric .....                           | 375.1.<br>375.3.....                       | 4500-SO <sub>4</sub> -C or D [18th,<br>19th, 20th].  | .....             | .....   | ..... | 925,54 <sup>3</sup> .<br>426C <sup>30</sup> .         |
| 66. Sulfide (as S), mg/L;<br>Titrimetric (iodine), or<br>Colorimetric (methylene blue) .....  | 376.1<br>376.2.....                        | 4500-S-2F [18th, 20th] or<br>4500-S-2E [18th].<br>4500-S-2D [18th, 19th,<br>20th].               | D516-90 .....     | .....   | ..... | I-3840-85.  |
| 67. Sulfite (as SO <sub>3</sub> ), mg/L.....  | .....                                      | .....  | .....             | .....   | ..... | .....   |

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| Trifluoromethyl (iodine-iodate) .....                                      | 377.1 .....              | 4500-SO <sub>2</sub> -2B [18h, 19h, 20h]. |                                |
| 68. Surfactants, mg/L:   | 425.1 .....              | 5540 C [18h, 19h, 20h] .....              | D2330-58.                      |
| Colorimetric (methylene blue) .....  |                          | 2550 B [18h, 19h, 20h] .....              |                                |
| 69. Temperature, °C:   | 170.1 .....              | 3111 B [18h, 19h].                        | Note 32.                       |
| Thermometric .....   |                          | 3120 B [18h, 19h, 20h].                   |                                |
| 70. Thallium—Total, <sup>4</sup> mg/L; Digestion <sup>1</sup> followed by: | 279.1 .....              | 3111 B [18h, 19h] .....                   |                                |
| AA direct aspiration .....   | 279.2 .....              | 3113 B [18h, 19h].                        |                                |
| AA furnace .....   | 200.7 <sup>5</sup> ..... | 3111 B [18h, 19h] .....                   |                                |
| ICP/AES .....  | 200.7 <sup>5</sup> ..... | 3113 B [18h, 19h].                        |                                |
| 71. Tin—Total, <sup>4</sup> mg/L; Digestion <sup>1</sup> followed by:      | 282.1 .....              | 3111 B [18h, 19h] .....                   | I-3850-78 <sup>6</sup> .       |
| AA direct aspiration .....   | 282.2 .....              | 3113 B [18h, 19h].                        |                                |
| AA furnace, or .....   | 200.7 <sup>5</sup> ..... | 3111 D [18h, 19h].                        |                                |
| ICP/AES .....  |                          | 3113 B [18h, 19h].                        |                                |
| 72. Titanium—Total, <sup>4</sup> mg/L; Digestion <sup>1</sup> followed by: | 283.1 .....              | 3111 D [18h, 19h].                        | Note 34.                       |
| AA direct aspiration .....   | 283.2 .....              | 2130 B [18h, 19h, 20h] .....              |                                |
| AA furnace .....   |                          | D1889-94(A) .....                         |                                |
| DGP .....  |                          | I-3860-85.                                |                                |
| 73. Turbidity, NTU:  | 180.1 .....              | 3111 D [18h, 19h, 20h] .....              |                                |
| Nephelometric .....  |                          | D3373-83.                                 |                                |
| 74. Vanadium—Total, <sup>4</sup> mg/L; Digestion <sup>1</sup> followed by: | 286.1 .....              | 3120 B [18h, 19h, 20h] .....              | I-4471-97 <sup>9</sup> .       |
| AA direct aspiration .....   | 286.2 .....              | 3500-V B [20h] and 3500-V D [18h, 19h].   |                                |
| AA furnace .....   | 200.7 <sup>5</sup> ..... | D4190-94 .....                            |                                |
| ICP/AES .....  |                          | 3500-V B [20h] and 3500-V D [18h, 19h].   |                                |
| DGP, or  |                          | D1691-95(A or B) .....                    |                                |
| Colorimetric (Gallic Acid) .....   |                          | I-3800-85 .....                           |                                |
| 75. Zinc—Total, <sup>4</sup> mg/L; Digestion <sup>1</sup> followed by:     | 289.1 .....              | 3111 B or C [18h, 19h] .....              | I-3842-73 p. 37 <sup>9</sup> . |
| AA direct aspiration <sup>38</sup> .....                                   | 289.2 .....              | 3120 B [18h, 19h, 20h] .....              |                                |
| AA furnace .....   | 200.7 <sup>5</sup> ..... | 3500-Zn E [18h, 19h].                     |                                |
| ICP/AES <sup>38</sup> .....  |                          | D4190-94 .....                            |                                |
| DGP <sup>38</sup> , or   |                          | 3500-Zn B [20h] and 3500-Zn F [18h, 19h]. |                                |
| Colorimetric (Dithizone) or (Zncon) .....                                  |                          | Note 34.                                  |                                |
|  |                          | Note 33.                                  |                                |

Table 1B Notes:

<sup>1</sup>Methods for Chemical Analysis of Water and Wastes," Environmental Protection Agency, Environmental Monitoring Systems Laboratory—Cincinnati (EMSL-C), EPA-600/4-79-020, Revised March 1983 and 1979 where applicable.

<sup>2</sup>Fishman, M.J., et al., "Methods for Analysis of Inorganic Substances in Water and Fluvial Sediments," U.S. Department of the Interior, Techniques of Water-Resource Investigations of the U.S. Geological Survey, Denver, CO, Revised 1989, unless otherwise stated.

<sup>3</sup>"Official Methods of Analysis of the Association of Official Analytical Chemists," methods manual, 15th ed. (1990).

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<sup>4</sup>For the determination of total metals the sample is not filtered before processing. A digestion procedure is required to solubilize suspended material and to destroy possible organic-metal complexes. Two digestion procedures are given in "Methods for Chemical Analysis of Water and Wastes," 1979 and 1983. One (Section 4.1) is a vigorous digestion using nitric acid. A less vigorous digestion using nitric and hydrochloric acids (Section 4.4) is preferred; however, the analyst should be cautioned that this mild digestion may not suffice for all sample types. Particularly, if a colorimetric procedure is to be employed, it is necessary to ensure that the metal is broken so that the metal is in a reactive state. In those situations, the vigorous digestion, however, vigorous digestion making certain that at no time does the sample go to dryness. Samples containing large amounts of organic materials may also benefit by this vigorous digestion; however, vigorous digestion with concentrated nitric acid will convert antimony and tin to insoluble oxides and render them unavailable for analysis. Use of ICP/AES as well as determinations for certain elements such as antimony, arsenic, the noble metals, mercury, selenium, silver, tin, and titanium require a modified sample digestion procedure and in all cases the method write-up should be consulted to specific instructions and/or cautions.

**Note 18 Note 4:** If the digestion procedure for direct aspiration AA included in one of the other approved references is different than the above, the EPA procedure must be used. Dissolved metals are defined as those constituents which will pass through a 0.45 micron membrane filter. Following the sample, the referenced procedure for total metals must be used. Sample digestion of the filtrate for dissolved metals (or digestion of the original sample solution for total metals) may be omitted for AA (direct aspiration or graphite furnace) and ICP analyses, provided the sample solution to be analyzed meets the following criteria:

- is a low COD (<20)
- is visibly transparent with a turbidity measurement of 1 NTU or less
- is colorless with no perceptible odor, and
- is of one liquid phase and free of particulate or suspended matter following acidification.

<sup>5</sup>Manual distillation is not required if comparability data on representative effluent samples are on company file to show that this preliminary distillation step is not necessary; however, manual distillation will be required to resolve any controversies.

<sup>6</sup>Ammonia, Automated Electrode Method, Industrial Method Number 319-75 WE, dated February 19, 1976, Bran & Luebbe (Technicon) Auto Analyzer II, Bran & Luebbe Analyzing Technologies, Inc., Elmsford, NY 10523.

<sup>7</sup>The approved method is that cited in "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," USGS TWRI, Book 5, Chapter A1 (1979).

<sup>8</sup>American National Standard on Graphographic Processing Effluents, Apr. 2, 1975, Available from ANSI, 25 West 43rd Street, New York, NY 10036.

<sup>9</sup>Selected Analytical Methods Published and Cited by the United States Environmental Protection Agency, Supplement to the Fifteenth Edition of Standard Methods for the Examination of Water and Wastewater (1981).

<sup>10</sup>The use of normal and wastewater differential pulse voltage ramps to increase sensitivity and resolution is acceptable.

<sup>11</sup>Carboxylic bioassay oxygen demand (CBOD<sub>5</sub>) must not be confused with the traditional BOD<sub>5</sub> test method which measures "total BOD<sub>5</sub>". The addition of the nitrification inhibitor is not a procedural option, but must be included to report the CBOD<sub>5</sub> parameter. A discharge whose permit requires reporting the traditional BOD<sub>5</sub> may not use a nitrification inhibitor in the procedure for reporting the results. Only when a discharger's permit specifically states CBOD<sub>5</sub> is required to permit report data using a nitrification inhibitor.

<sup>12</sup>OC Chemical Oxygen Demand Method, Oceanography International Corporation, 1978, 512 West Loop, P.O. Box 2980, College Station, TX 77840.

<sup>13</sup>Chemical Oxygen Demand, Method 8000, Hach Handbook of Water Analysis, 1979, Hach Chemical Company, PO Box 389, Loveland, CO 80537.

<sup>14</sup>The back titration method will be used to resolve controversy.

<sup>15</sup>Orion Research Instruction Manual, Residual Chlorine Electrode Model 97-70, 1977, Orion Research Incorporated, 840 Memorial Drive, Cambridge, MA 02138. The calibration graph for the Orion residual chlorine method must be derived using a reagent blank and three standard solutions, containing 0.2, 1.0, and 5.0 ml. 0.0281 N potassium iodate/100 ml solution, respectively.

<sup>16</sup>The approved method is that cited in Standard Methods for the Examination of Water and Wastewater, 14th Edition, 1976.

<sup>17</sup>National Council of the Paper Industry for Air and Stream Improvement, Inc. Technical Bulletin 253, December 1971.

<sup>18</sup>Copper, Bicinchonimate Method, Method 8506, Hach Handbook of Water Analysis, 1979, Hach Chemical Company, PO Box 389, Loveland, CO 80537.

<sup>19</sup>After the manual distillation is completed, the autoanalyzer manifold in EPA Methods 335.3 (cyanide) or 420.2 (phenols) are simplified by connecting the re-sample line directly to the sampler. When using this manifold setup shown in Method 335.3, the buffer 6.2 should be replaced with the buffer 7.5 found in Method 335.2.

<sup>20</sup>Hydrogen ion (pH) Automated Electrode Method, Industrial Method Number 378-75WA, October 1976, Bran & Luebbe Analyzing Technologies, Inc., Elmsford, NY 10523.

<sup>21</sup>Iron, 1,10-Phanthroline Method, Method 8008, 1980, Hach Chemical Company, PO Box 389, Loveland, CO 80537.

<sup>22</sup>Manganese, Periodate Oxidation Method, Method 8034, Hach Handbook of Wastewater Analysis, 1979, pages 2-113 and 2-117, Hach Chemical Company, Loveland, CO 80537.

<sup>23</sup>Nitrogen, Nitrite Method, Method 8507, Hach Chemical Company, PO Box 389, Loveland, CO 80537.

<sup>24</sup>Wershaw, R.L., et al., "Methods for Analysis of Organic Substances in Water," Techniques of Water-Resources Investigation of the U.S. Geological Survey, Book 5, Chapter A3, (1972 Revised 1987) p. 14.

<sup>25</sup>Nitrogen, Nitrate Method, Method 8507, Hach Chemical Company, PO Box 389, Loveland, CO 80537.

<sup>26</sup>The approved method is cited in Standard Methods for the Examination of Water and Wastewater, 14th Edition. The colorimetric reaction is conducted at a pH of 10.0-0.2. The approved methods are given on pp. 576-81 of the 14th Edition: Method 5104 for distillation, Method 5108 for the manual colorimetric procedure, or Method 510C for the manual spectrometric procedure.

<sup>27</sup>R.F. Addison and R.G. Ackman, "Direct Determination of Elemental Phosphorus by Gas-Liquid Chromatography," Journal of Chromatography, Vol. 47, No. 3, pp. 421-426, 1970.

<sup>28</sup>Approved methods for the analysis of silver in industrial wastewaters at concentrations of 1 mg/l and above are relatively insoluble in reagents such as nitric acid but are readily soluble in an aqueous buffer of sodium hydroxide and sodium sulfite to pH of 12. Therefore, for levels of silver above 1 mg/l, 20 ml of sample should be diluted to 100 ml by adding 40 ml each of 2 M Na<sub>2</sub>SO<sub>3</sub>, and NaOH. Standards should be prepared in the same manner. For levels of silver below 1 mg/l, the approved method is satisfactory.

<sup>29</sup>The approved method is that cited in Standard Methods for the Examination of Water and Wastewater, 15th Edition.

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31 EPA Methods 335.2 and 335.3 require the NaOH absorber solution final concentration to be adjusted to 0.25 N before colorimetric determination of total cyanide.

32 Stevens, H.H., Fickie, J.F., and Smoot, G.F., "Water Temperature—Influential Factors, Field Measurement and Data Presentation," Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 1, Chapter D1, 1975.

33 Zinc, Zincon Method, Method 8009, Hach Handbook of Water Analysis, 1979, pages 2-231 and 2-333, Hach Chemical Company, Loveland, CO 80527.

34 "Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes, Method AES029," 1988—Revised 1991, Thermo Jarrell Ash Corporation, 27 Forge Parkway, Franklin, MA 02038.

35 Precision and recovery statements for the atomic absorption direct aspiration and graphite furnace methods, and for the spectrophotometric SDDC method for arsenic are provided in Appendix D of this part titled, "Precision and Recovery Statements for Methods for Measuring Metals".

36 "Closed Vessel Microwave Digestion of Wastewater Samples for Determination of Metals", CEM Corporation, PO Box 200, Matthews, NC 28108-0200, April 16, 1992. Available from the CEM Corporation.

37 When determining boron and silica, only plastic, PTFE, or quartz laboratoryware may be used from start until completion of analysis.

38 Only use Trichloroethylene (1,1,2-trichloro-1,2,2-trifluoroethane, CFC-113) extraction solvent when determining Hexane Extractable Material (analogous to EPA Method 1684A). Use of other extraction solvents is strictly prohibited.

39 Precision and recovery statements for the atomic absorption direct aspiration and graphite furnace methods, and for the spectrophotometric SDDC method for arsenic are provided in Appendix D of this part titled, "Precision and Recovery Statements for Methods for Measuring Metals".

40 Nitrogen, Total Kjeldahl, Method PAI-DK02 (Block Digestion, Steam Distillation, Colorimetric Detection), revised 12/22/94, OI Analytical/ALPKEM, PO Box 9010, College Station, TX 77842.

41 Nitrogen, Total Kjeldahl, Method PAI-DK03 (Block Digestion, Automated FIA Gas Diffusion), revised 12/22/94, OI Analytical/ALPKEM, PO Box 9010, College Station, TX 77842.

42 Method 1684, Revision A, "In-Hexane Extractable Material (HEM, Oil and Grease) and Silica, Gel Treated in-Hexane Extractable Material (SGT-HEM, Non-polar Material) by Extraction and Gravimetry," EPA-821-F-98-012, February 1989, Available at NTIS, PB-121949, U.S. Department of Commerce, 5225 Port Royal, Springfield, Virginia 22161.

43 USEPA, 2002, Method 1631, Revision E, "Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry," September 2002, Office of Water, U.S. Environmental Protection Agency, EPA-821-F-02-019. The application of clean techniques described in EPA's draft Method 1639, Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (EPA-821-F-96-011) are recommended to preclude contamination at low-level trace metal determinations.

44 Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Ammonia Plus Organic Nitrogen by a Kjeldahl Digestion Method", Open File Report (OFR) 00-170.

45 Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Chromium in Water by Graphite Furnace Atomic Absorption Spectrophotometry", Open File Report (OFR) 92-29.

46 Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Molybdenum by Graphite Furnace Atomic Absorption Spectrophotometry", Open File Report (OFR) 97-198.

47 Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Total Phosphorus by Kjeldahl Digestion Method and an Automated Colorimetric Finish That Includes Dialysis, Open File Report (OFR) 92-116.

48 Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Arsenic and Selenium in Water and Sediment by Graphite Furnace-Atomic Absorption Spectrometry", Open File Report (OFR) 98-639.

49 Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Elements in Whole-water Digests Using Inductively Coupled Plasma-Optical Emission Spectrometry and Inductively Coupled Plasma-Mass Spectrometry", Open File Report (OFR) 98-165.

50 Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of inorganic and Organic Constituents in Water and Fluvial Sediment", Open File Report (OFR) 93-125.

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS

| Parameter <sup>1</sup>  | EPA method number <sup>2,7</sup> |                                |           |  | Other approved methods |
|-------------------------|----------------------------------|--------------------------------|-----------|--|------------------------|
|                         | GC                               | GC/MS                          | HPLC      | Standard Methods [Edition(s)]                                    |                        |
| 1. Acenaphthene .....   | 610 .....                        | 625, 1625B .....               | 610 ..... | 6440 B [18th, 19th, 20th];<br>6440 B, 6410 B [18th, 19th, 20th]; | D4657-92 .....         |
| 2. Acenaphthylene ..... | 610 .....                        | 625, 1625B .....               | 610 ..... | 6440 B, 6410 B [18th, 19th, 20th];                               | D4657-92 .....         |
| 3. Acrolein .....       | 603 .....                        | 624 <sup>a</sup> , 1624B ..... | 610 ..... | 6410 B, 6440 B [18th, 19th, 20th];                               | D4657-92 .....         |
| 4. Acryonitrile .....   | 603 .....                        | 624 <sup>a</sup> , 1624B ..... | 610 ..... | 6410 B, 6440 B [18th, 19th, 20th];                               | D4657-92 .....         |
| 5. Anthracene .....     | 610 .....                        | 625, 1625B .....               | 610 ..... | 6410 B, 6440 B [18th, 19th, 20th];                               | D4657-92 .....         |

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| Symbol               | Quantity                                       | Unit                     | Unit symbol       | Base SI units  |
|----------------------|--|--------------------------|-------------------|--|
| <i>m</i>             | mass   | kilogram                 | kg                | kg   |
| <i>m</i>             | mass rate                                      | kilogram per second      | kg/s              | kg · s <sup>-1</sup>   |
| <i>v</i>             | viscosity, kinematic                           | meter squared per second | m <sup>2</sup> /s | m <sup>2</sup> · s <sup>-1</sup>                               |
| <i>N</i>             | total number in series                         |                          |                   |  |
| <i>n</i>             | amount of substance                            | mole                     | mol               | mol  |
| <i>n̄</i>            | amount of substance rate                       | mole per second          | mol/s             | mol · s <sup>-1</sup>  |
| <i>P</i>             | power  | kilowatt                 | kW                | 10 <sup>3</sup> · m <sup>2</sup> · kg · s <sup>-3</sup>        |
| <i>PF</i>            | penetration fraction                           |                          |                   |  |
| <i>p</i>             | pressure                                       | pascal                   | Pa                | m <sup>-1</sup> · kg · s <sup>-2</sup>                         |
| <i>p</i>             | mass density                                   | kilogram per cubic meter | kg/m <sup>3</sup> | kg · m <sup>-3</sup>   |
| <i>r</i>             | ratio of pressures                             | pascal per pascal        | Pa/Pa             | 1  |
| <i>R<sup>2</sup></i> | coefficient of determination                   |                          |                   |  |
| <i>Ra</i>            | average surface roughness                      | micrometer               | μm                | m <sup>-6</sup>  |
| <i>Re</i>            | Reynolds number                                |                          |                   |  |
| <i>RF</i>            | response factor                                | 0.01                     | %                 | 10 <sup>-2</sup>   |
| <i>RH%</i>           | relative humidity                              |                          |                   |  |
| <i>σ</i>             | non-biased standard deviation                  | kelvin                   | K                 | K  |
| <i>S</i>             | Sutherland constant                            | kelvin                   | K                 | K  |
| <i>SEE</i>           | standard estimate of error                     | degree Celsius           | °C                | K-273.15   |
| <i>T</i>             | absolute temperature                           | newton meter             | N · m             | m <sup>2</sup> · kg · s <sup>-2</sup>                          |
| <i>T</i>             | Celsius temperature                            | second                   | s                 | s  |
| <i>T</i>             | torque (moment of force)                       | second                   | s                 | s  |
| <i>t</i>             | time   | cubic meter              | m <sup>3</sup>    | m <sup>3</sup>   |
| <i>Δt</i>            | time interval, period, 1/frequency             | cubic meter per second   | m <sup>3</sup> /s | m <sup>3</sup> · s <sup>-1</sup>                               |
| <i>V</i>             | volume   | kilowatt hour            | kW · h            | 3.6 · 10 <sup>-6</sup> · m <sup>2</sup> · kg · s <sup>-2</sup> |
| <i>V̄</i>            | volume rate                                    | gram per gram            | g/g               | 1  |
| <i>W</i>             | work   | mole per mole            | mol/mol           | ( <sup>1</sup> )   |
| <i>w<sub>c</sub></i> | carbon mass concentration                      | mole per mole            | mol/mol           | 1  |
| <i>x</i>             | amount of substance mole fraction <sup>2</sup> |                          |                   |  |
| <i>̄x</i>            | flow-weighted mean concentration               |                          |                   |  |
| <i>y</i>             | generic variable                               |                          |                   |  |

<sup>1</sup> See paragraph (f)(2) of this section for the values to use for molar masses. Note that in the cases of NO<sub>x</sub> and HC, the regulations specify effective molar masses based on assumed speciation rather than actual speciation.

<sup>2</sup> Note that mole fractions for THC, THCE, NMHC, NMHCE, and NOTHC are expressed on a C1 equivalent basis.

\* \* \* \* \*

(g) *Other acronyms and abbreviations.* This part uses the following additional abbreviations and acronyms:

ASTM American Society for Testing and Materials  
 BMD bag mini-diluter  
 BSFC brake-specific fuel consumption  
 CARB California Air Resources Board  
 CFR Code of Federal Regulations  
 CFV critical-flow venturi  
 CI compression-ignition  
 CITT Curb Idle Transmission Torque  
 CLD chemiluminescent detector  
 CVS constant-volume sampler  
 DF deterioration factor  
 ECM electronic control module  
 EFC electronic flow control  
 EGR exhaust gas recirculation  
 EPA Environmental Protection Agency  
 FEL Family Emission Limit  
 FID flame-ionization detector  
 IBP initial boiling point  
 ISO International Organization for Standardization  
 LPG liquefied petroleum gas  
 NDIR nondispersive infrared  
 NDUV nondispersive ultraviolet  
 NIST National Institute for Standards and Technology  
 PDP positive-displacement pump

PEMS portable emission measurement system

PFD partial-flow dilution

PMP Polymethylpentene

pt. a single point at the mean value expected at the standard

PTFE polytetrafluoroethylene (commonly known as Teflon™)

RE rounding error.

RMC ramped-modal cycle

RMS root-mean square

RTD resistive temperature detector

SSV subsonic venturi

SI spark-ignition

UCL upper confidence limit

UFM ultrasonic flow meter

U.S.C. United States Code

#### § 1065.1010 · Reference materials.

Documents listed in this section have been incorporated by reference into this part. The Director of the Federal Register approved the incorporation by reference as prescribed in 5 U.S.C. 552(a) and 1 CFR part 51. Anyone may inspect copies at the U.S. EPA, Air and Radiation Docket and Information Center, 1301 Constitution Ave., NW.,

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Room B102, EPA West Building, Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(a) **ASTM material.** Table 1 of this section lists material from the American

Society for Testing and Materials that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the American Society for Testing and Materials, 100 Barr Harbor Dr., P.O. Box C700, West Conshohocken, PA 19428 or [www.astm.com](http://www.astm.com). Table 1 follows:

TABLE 1 OF § 1065.1010—ASTM MATERIALS

| Document number and name   | Part 1065 reference |
|--|---------------------|
| ASTM D 86-04b, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure .....   | 1065.703, 1065.710  |
| ASTM D 93-02a, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester .....   | 1065.703            |
| ASTM D 287 92 (Reapproved 2000), Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method) .....  | 1065.703            |
| ASTM D 323-99a, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method) ..   | 1065.710            |
| ASTM D 445-04, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity) .....   | 1065.703            |
| ASTM D 613-03b, Standard Test Method for Cetane Number of Diesel Fuel Oil .....  | 1065.703            |
| ASTM D 910-04a, Standard Specification for Aviation Gasolines .....  | 1065.701            |
| ASTM D 975-04c, Standard Specification for Diesel Fuel Oils .....  | 1065.701            |
| ASTM D 1266-98 (Reapproved 2003), Standard Test Method for Sulfur in Petroleum Products (Lamp Method) .....  | 1065.710            |
| ASTM D 1267-02, Standard Test Method for Gage Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method) .....   | 1065.720            |
| ASTM D 1319-03, Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption .....  | 1065.710            |
| ASTM D 1655-04a, Standard Specification for Aviation Turbine Fuels .....   | 1065.701            |
| ASTM D 1837-02a, Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases .....   | 1065.720            |
| ASTM D 1838-03, Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases .....  | 1065.720            |
| ASTM D 1945-03, Standard Test Method for Analysis of Natural Gas by Gas Chromatography .....   | 1065.715            |
| ASTM D 2158-04, Standard Test Method for Residues in Liquefied Petroleum (LP) Gases .....  | 1065.720            |
| ASTM D 2163-91 (Reapproved 1996), Standard Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propene Concentrates by Gas Chromatography .....   | 1065.720            |
| ASTM D 2598-02, Standard Practice for Calculation of Certain Physical Properties of Liquefied Petroleum (LP) Gases from Compositional Analysis .....   | 1065.720            |
| ASTM D 2622-03, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry .....   | 1065.703            |
| ASTM D 2713-91 (Reapproved 2001), Standard Test Method for Dryness of Propane (Valve Freeze Method) .....  | 1065.720            |
| ASTM D 2784-98 (Reapproved 2003), Standard Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp) .....   | 1065.720            |
| ASTM D 2880-03, Standard Specification for Gas Turbine Fuel Oils .....   | 1065.701            |
| ASTM D 2986-95a (Reapproved 1999), Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Diethyl Phthalate) Smoke Test .....  | 1065.170            |
| ASTM D 3231-02, Standard Test Method for Phosphorus in Gasoline .....  | 1065.710            |
| ASTM D 3237-02, Standard Test Method for Lead in Gasoline By Atomic Absorption Spectroscopy ..   | 1065.710            |
| ASTM D 4814-04b, Standard Specification for Automotive Spark-Ignition Engine Fuel .....  | 1065.701            |
| ASTM D 5186-03, Standard Test Method for Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels By Supercritical Fluid Chromatography ..... | 1065.703            |
| ASTM D 5797-96 (Reapproved 2001), Standard Specification for Fuel Methanol (M70-M85) for Automotive Spark-Ignition Engines .....   | 1065.701            |
| ASTM D 5798-99 (Reapproved 2004), Standard Specification for Fuel Ethanol (E75-E85) for Automotive Spark-Ignition Engines .....  | 1065.701            |
| ASTM D 6615-04a, Standard Specification for Jet B Wide-Cut Aviation Turbine Fuel .....   | 1065.701            |
| ASTM D 6751-03a, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels .....  | 1065.701            |
| ASTM D 6985-04a, Standard Specification for Middle Distillate Fuel Oil Military Marine Applications ..   | 1065.701            |
| ASTM F 1471-93 (Reapproved 2001), Standard Test Method for Air Cleaning Performance of a High-Efficiency Particulate Air Filter System .....   | 1065.1001           |

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(b) *ISO material.* Table 2 of this section lists material from the International Organization for Standardization that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this

part where we reference it. Anyone may purchase copies of these materials from the International Organization for Standardization, Case Postale 56, CH-1211 Geneva 20, Switzerland or [www.iso.org](http://www.iso.org). Table 2 follows:

TABLE 2 OF § 1065.1010—ISO MATERIALS

| Document number and name   | Part 1065 reference |
|--|---------------------|
| ISO 14644-1, Cleanrooms and associated controlled environments ..... | 1065.190            |

(c) *NIST material.* Table 3 of this section lists material from the National Institute of Standards and Technology that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this

part where we reference it. Anyone may purchase copies of these materials from the Government Printing Office, Washington, DC 20402 or download them free from the Internet at [www.nist.gov](http://www.nist.gov). Table 3 follows:

TABLE 3 OF § 1065.1010. NIST MATERIALS

| Document number and name  | Part 1065 reference           |
|---|-------------------------------|
| NIST Special Publication 811, 1995 Edition, Guide for the Use of the International System of Units (SI), Barry N. Taylor, Physics Laboratory .....                      | 1065.20, 1065.1001, 1065.1005 |
| NIST Technical Note 1297, 1994 Edition, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, Barry N. Taylor and Chris E. Kuyatt ..... | 1065.1001                     |

(d) *SAE material.* Table 4 of this section lists material from the Society of Automotive Engineering that we have incorporated by reference. The first column lists the number and name of the material. The second column lists

the sections of this part where we reference it. Anyone may purchase copies of these materials from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096 or [www.sae.org](http://www.sae.org). Table 4 follows:

TABLE 4 OF § 1065.1010. SAE MATERIALS

| Document number and name  | Part 1065 reference |
|---|---------------------|
| "Optimization of Flame Ionization Detector for Determination of Hydrocarbon in Diluted Automotive Exhausts," Reschke Glen D., SAE 770141 .....                        | 1065.360            |
| "Relationships Between Instantaneous and Measured Emissions in Heavy Duty Applications," Ganesan B. and Clark N. N., West Virginia University, SAE 2001-01-3536 ..... | 1065.309            |

(e) *California Air Resources Board material.* Table 5 of this section lists material from the California Air Resources Board that we have incorporated by reference. The first column lists the number and name of the material. The

second column lists the sections of this part where we reference it. Anyone may get copies of these materials from the California Air Resources Board 9528 Telstar Ave., El Monte, California 91731. Table 5 follows:

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|               |   |
|---------------|---|
| GC-FID .....  | gas chromatograph with a flame ionization detector.         |
| HEPA .....    | high-efficiency particulate air.                            |
| IBP .....     | initial boiling point.                                      |
| IBR .....     | incorporated by reference.                                  |
| i.e. ....     | in other words.   |
| ISO .....     | International Organization for Standardization.             |
| LPG .....     | liquefied petroleum gas.                                    |
| MPD .....     | magnetopneumatic detection.                                 |
| NDIR .....    | nondispersive infrared.                                     |
| NDUV .....    | nondispersive ultraviolet.                                  |
| NIST .....    | National Institute for Standards and Technology.            |
| NMC .....     | nonmethane cutter.  |
| PDP .....     | positive-displacement pump.                                 |
| PEMS .....    | portable emission measurement system.                       |
| PFD .....     | partial-flow dilution.                                      |
| PLOT .....    | porous layer open tubular.                                  |
| PMD .....     | paramagnetic detection.                                     |
| PMP .....     | Polymethylpentene.  |
| pt .....      | a single point at the mean value expected at the standard.  |
| psi .....     | pounds per square inch.                                     |
| PTFE .....    | polytetrafluoroethylene (commonly known as Teflon™).        |
| RE .....      | rounding error.   |
| RESS .....    | rechargeable energy storage system.                         |
| RFFP .....    | response factor penetration fraction.                       |
| RMC .....     | ramped-modal cycle.   |
| rms .....     | root-mean square.   |
| RTD .....     | resistive temperature detector.                             |
| SAW .....     | surface acoustic wave.                                      |
| SEE .....     | standard estimate of error.                                 |
| SSV .....     | subsonic venturi.   |
| SI .....      | spark-ignition.   |
| THC-FID ..... | total hydrocarbon flame ionization detector.                |
| TINV .....    | inverse student <i>t</i> -test function in Microsoft Excel. |
| UCL .....     | upper confidence limit.                                     |
| UFM .....     | ultrasonic flow meter.                                      |
| U.S.C. ....   | United States Code.   |

[79 FR 23815, Apr. 28, 2014, as amended at 81 FR 74191, Oct. 25, 2016]

EFFECTIVE DATE NOTE: At 86 FR 34575, June 29, 2021, §1065.1005 was amended, effective July 29, 2021.

**§ 1065.1010 Incorporation by reference.**

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, a document must be published in the FEDERAL REGISTER and the material must be available to the public. All approved materials are available for inspection at the Air and Radiation Docket and Information Center (Air Docket) in the EPA Docket Center (EPA/DC) at Rm. 3334, EPA West Bldg., 1301 Constitution Ave. NW., Washington, DC. The EPA/DC Public Reading Room hours of operation are 8:30 a.m. to 4:30 p.m., Monday through Fri-

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day, excluding legal holidays. The telephone number of the EPA/DC Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742. These approved materials are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email [fedreg.legal@nara.gov](mailto:fedreg.legal@nara.gov) or go to [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html). In addition, these materials are available from the sources listed below.

(b) *ASTM material.* The following standards are available from ASTM International, 100 Barr Harbor Dr., P.O. Box C700, West Conshohocken, PA 19428-2959, (877) 909-2786, or <http://www.astm.org>:

(1) ASTM D86-12, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure, approved December 1, 2012 (“ASTM D86”), IBR approved for §§1065.703(b) and 1065.710(b) and (c).

(2) ASTM D93-13, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester, approved July 15, 2013 (“ASTM D93”), IBR approved for §1065.703(b).

(3) ASTM D130-12, Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test, approved November 1, 2012 (“ASTM D130”), IBR approved for §1065.710(b).

(4) ASTM D381-12, Standard Test Method for Gum Content in Fuels by Jet Evaporation, approved April 15, 2012 (“ASTM D381”), IBR approved for §1065.710(b).

(5) ASTM D445-12, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity), approved April 15, 2012 (“ASTM D445”), IBR approved for §1065.703(b).

(6) ASTM D525-12a, Standard Test Method for Oxidation Stability of Gasoline (Induction Period Method), approved September 1, 2012 (“ASTM D525”), IBR approved for §1065.710(b).

(7) ASTM D613-13, Standard Test Method for Cetane Number of Diesel Fuel Oil, approved December 1, 2013 (“ASTM D613”), IBR approved for §1065.703(b).

(8) ASTM D910-13a, Standard Specification for Aviation Gasolines, approved December 1, 2013 (“ASTM D910”), IBR approved for §1065.701(f).

(9) ASTM D975-13a, Standard Specification for Diesel Fuel Oils, approved December 1, 2013 (“ASTM D975”), IBR approved for §1065.701(f).

(10) ASTM D1267-12, Standard Test Method for Gage Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method), approved

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November 1, 2012 ("ASTM D1267"), IBR approved for § 1065.720(a).

(11) ASTM D1319-13, Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption, approved May 1, 2013 ("ASTM D1319"), IBR approved for § 1065.710(c).

(12) ASTM D1655-13a, Standard Specification for Aviation Turbine Fuels, approved December 1, 2013 ("ASTM D1655"), IBR approved for § 1065.701(f).

(13) ASTM D1837-11, Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases, approved October 1, 2011 ("ASTM D1837"), IBR approved for § 1065.720(a).

(14) ASTM D1838-12a, Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases, approved December 1, 2012 ("ASTM D1838"), IBR approved for § 1065.720(a).

(15) ASTM D1945-03 (Reapproved 2010), Standard Test Method for Analysis of Natural Gas by Gas Chromatography, approved January 1, 2010 ("ASTM D1945"), IBR approved for § 1065.715(a).

(16) ASTM D2158-11, Standard Test Method for Residues in Liquefied Petroleum (LP) Gases, approved January 1, 2011 ("ASTM D2158"), IBR approved for § 1065.720(a).

(17) ASTM D2163-07, Standard Test Method for Determination of Hydrocarbons in Liquefied Petroleum (LP) Gases and Propane/Propene Mixtures by Gas Chromatography, approved December 1, 2007 ("ASTM D2163"), IBR approved for § 1065.720(a).

(18) ASTM D2598-12, Standard Practice for Calculation of Certain Physical Properties of Liquefied Petroleum (LP) Gases from Compositional Analysis, approved November 1, 2012 ("ASTM D2598"), IBR approved for § 1065.720(a).

(19) ASTM D2622-16, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry, approved January 1, 2016 ("ASTM D2622"), IBR approved for §§ 1065.703(b) and 1065.710(b) and (c).

(20) ASTM D2699-13b, Standard Test Method for Research Octane Number of Spark-Ignition Engine Fuel, approved October 1, 2013 ("ASTM D2699"), IBR approved for § 1065.710(b).

(21) ASTM D2700-13b, Standard Test Method for Motor Octane Number of Spark-Ignition Engine Fuel, approved October 1, 2013 ("ASTM D2700"), IBR approved for § 1065.710(b).

(22) ASTM D2713-13, Standard Test Method for Dryness of Propane (Valve Freeze Method), approved October 1, 2013 ("ASTM D2713"), IBR approved for § 1065.720(a).

(23) ASTM D2784-11, Standard Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp), approved January 1, 2011 ("ASTM D2784"), IBR approved for § 1065.720(a).

(24) ASTM D2880-13b, Standard Specification for Gas Turbine Fuel Oils, approved November 15, 2013 ("ASTM D2880"), IBR approved for § 1065.701(f).

(25) ASTM D2986-95a, Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Diethyl Phthalate) Smoke Test, approved September 10, 1995 ("ASTM D2986"), IBR approved for § 1065.170(c). (Note: This standard was withdrawn by ASTM.)

(26) ASTM D3231-13, Standard Test Method for Phosphorus in Gasoline, approved June 15, 2013 ("ASTM D3231"), IBR approved for § 1065.710(b) and (c).

(27) ASTM D3237-12, Standard Test Method for Lead in Gasoline By Atomic Absorption Spectroscopy, approved June 1, 2012 ("ASTM D3237"), IBR approved for § 1065.710(b) and (c).

(28) ASTM D4052-11, Standard Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter, approved October 15, 2011 ("ASTM D4052"), IBR approved for § 1065.703(b).

(29) ASTM D4629-12, Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection, approved April 15, 2012 ("ASTM D4629"), IBR approved for § 1065.655(e).

(30) ASTM D4814-13b, Standard Specification for Automotive Spark-Ignition Engine Fuel, approved December 1, 2013 ("ASTM D4814"), IBR approved for § 1065.701(f).

(31) ASTM D4815-13, Standard Test Method for Determination of MTBE, ETBE, TAME, DiPE, tertiary-Amyl Alcohol and C<sub>1</sub> to C<sub>4</sub> Alcohols in Gasoline by Gas Chromatography, approved October 1, 2013 ("ASTM D4815"), IBR approved for § 1065.710(b).

(32) ASTM D5186-03 (Reapproved 2009), Standard Test Method for Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels By Supercritical Fluid Chromatography, approved April 15, 2009 ("ASTM D5186"), IBR approved for § 1065.703(b).

(33) ASTM D5191-13, Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method), approved December 1, 2013 ("ASTM D5191"), IBR approved for § 1065.710(b) and (c).

(34) ASTM D5291-10, Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants, approved May 1, 2010 ("ASTM D5291"), IBR approved for § 1065.655(e).

(35) ASTM D5453-19a, Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence, approved July 1, 2019 ("ASTM D5453"), IBR approved for §§ 1065.703(b) and 1065.710(b).

(36) ASTM D5599-00 (Reapproved 2010), Standard Test Method for Determination of

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Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detection, approved October 1, 2010 ("ASTM D5599"), IBR approved for §§ 1065.655(e) and 1065.710(b).

(37) ASTM D5762-12 Standard Test Method for Nitrogen in Petroleum and Petroleum Products by Boat-Inlet Chemiluminescence, approved April 15, 2012 ("ASTM D5762"), IBR approved for § 1065.655(e).

(38) ASTM D5769-10, Standard Test Method for Determination of Benzene, Toluene, and Total Aromatics in Finished Gasolines by Gas Chromatography/Mass Spectrometry, approved May 1, 2010 ("ASTM D5769"), IBR approved for § 1065.710(b).

(39) ASTM D5797-13, Standard Specification for Fuel Methanol (M70- M85) for Automotive Spark-Ignition Engines, approved June 15, 2013 ("ASTM D5797"), IBR approved for § 1065.701(f).

(40) ASTM D5798-13a, Standard Specification for Ethanol Fuel Blends for Flexible Fuel Automotive Spark-Ignition Engines, approved June 15, 2013 ("ASTM D5798"), IBR approved for § 1065.701(f).

(41) ASTM D6348-12<sup>el</sup>, Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, approved February 1, 2012 ("ASTM D6348"), IBR approved for §§ 1065.266(b) and 1065.275(b).

(42) ASTM D6550-10, Standard Test Method for Determination of Olefin Content of Gasolines by Supercritical-Fluid Chromatography, approved October 1, 2010 ("ASTM D6550"), IBR approved for § 1065.710(b).

(43) ASTM D6615-11a, Standard Specification for Jet B Wide-Cut Aviation Turbine Fuel, approved October 1, 2011 ("ASTM D6615"), IBR approved for § 1065.701(f).

(44) ASTM D6751-12, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels, approved August 1, 2012 ("ASTM D6751"), IBR approved for § 1065.701(f).

(45) ASTM D6985-04a, Standard Specification for Middle Distillate Fuel Oil—Military Marine Applications, approved November 1, 2004 ("ASTM D6985"), IBR approved for § 1065.701(f). (NOTE: This standard was withdrawn by ASTM.)

(46) ASTM D7039-15a (Reapproved 2020), Standard Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry, approved May 1, 2020 ("ASTM D7039"), IBR approved for §§ 1065.703(b) and 1065.710(b).

(47) ASTM F1471-09, Standard Test Method for Air Cleaning Performance of a High-Efficiency Particulate Air Filter System, approved March 1, 2009 ("ASTM F1471"), IBR approved for § 1065.1001.

(c) *California Air Resources Board material.* The following documents are

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available from the California Air Resources Board, Haagen-Smit Laboratory, 9528 Telstar Ave., El Monte, CA 91731-2908, (800) 242-4450, or <http://www.arb.ca.gov>:

(1) California Non-Methane Organic Gas Test Procedures, Amended July 30, 2002, Mobile Source Division, California Air Resources Board, IBR approved for § 1065.805(f).

(2) [Reserved]

(d) *Institute of Petroleum material.* The following documents are available from the Energy Institute, 61 New Cavendish St., London, W1G 7AR, UK, or by calling + 44-(0)20-7467-7100, or at <http://www.energyinst.org>:

(1) IP-470, 2005, Determination of aluminum, silicon, vanadium, nickel, iron, calcium, zinc, and sodium in residual fuels by atomic absorption spectrometry, IBR approved for § 1065.705(b).

(2) IP-500, 2003, Determination of the phosphorus content of residual fuels by ultra-violet spectrometry, IBR approved for § 1065.705(b).

(3) IP-501, 2005, Determination of aluminum, silicon, vanadium, nickel, iron, sodium, calcium, zinc and phosphorus in residual fuel oil by ashing, fusion and inductively coupled plasma emission spectrometry, IBR approved for § 1065.705(b).

(e) *ISO material.* The following standards are available from the International Organization for Standardization, 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, 41-22-749-01-11, or <http://www.iso.org>:

(1) ISO 2719:2002, Determination of flash point—Pensky-Martens closed cup method ("ISO 2719"), IBR approved for § 1065.705(c).

(2) ISO 3016:1994, Petroleum products—Determination of pour point ("ISO 3016"), IBR approved for § 1065.705(c).

(3) ISO 3104:1994/Cor 1:1997, Petroleum products—Transparent and opaque liquids—Determination of kinematic viscosity and calculation of dynamic viscosity ("ISO 3104"), IBR approved for § 1065.705(c).

(4) ISO 3675:1998, Crude petroleum and liquid petroleum products—Laboratory determination of density—Hydrometer method ("ISO 3675"), IBR approved for § 1065.705(c).

(5) ISO 3733:1999, Petroleum products and bituminous materials—Determination of water—Distillation method ("ISO 3733"), IBR approved for § 1065.705(c).

(6) ISO 6245:2001, Petroleum products—Determination of ash ("ISO 6245"), IBR approved for § 1065.705(c).

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(7) ISO 8217:2012(E), Petroleum products—Fuels (class F)—Specifications of marine fuels, Fifth edition, August 15, 2012 (“ISO 8217”), IBR approved for § 1065.705(b) and (c).

(8) ISO 8754:2003, Petroleum products—Determination of sulfur content—Energy-dispersive X-ray Fluorescence spectrometry (“ISO 8754”), IBR approved for § 1065.705(c).

(9) ISO 10307-2(E):2009, Petroleum products—Total sediment in residual fuel oils—Part 2: Determination using standard procedures for ageing, Second Ed., February 1, 2009 (“ISO 10307”), as modified by ISO 10307-2:2009/Cor.1:2010(E), Technical Corrigendum 1, published May 15, 2010, IBR approved for § 1065.705(c).

(10) ISO 10370:1993/Cor 1:1996, Petroleum products—Determination of carbon residue—Micro method (“ISO 10370”), IBR approved for § 1065.705(c).

(11) ISO 10478:1994, Petroleum products—Determination of aluminium and silicon in fuel oils—Inductively coupled plasma emission and atomic absorption spectroscopy methods (“ISO 10478”), IBR approved for § 1065.705(c).

(12) ISO 12185:1996/Cor 1:2001, Crude petroleum and petroleum products—Determination of density—Oscillating U-tube method (“ISO 12185”), IBR approved for § 1065.705(c).

(13) ISO 14596:2007, Petroleum products—Determination of sulfur content—Wavelength-dispersive X-ray fluorescence spectrometry (“ISO 14596”), IBR approved for § 1065.705(c).

(14) ISO 14597:1997, Petroleum products—Determination of vanadium and nickel content—Wavelength dispersive X-ray fluorescence spectrometry (“ISO 14597”), IBR approved for § 1065.705(c).

(15) ISO 14644-1:1999, Cleanrooms and associated controlled environments (“ISO 14644”), IBR approved for § 1065.190(b).

(f) *NIST material*. The following documents are available from National Institute of Standards and Technology, 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899-1070, (301) 975-6478, or [www.nist.gov](http://www.nist.gov):

(1) NIST Special Publication 811, 2008 Edition, Guide for the Use of the International System of Units (SI), March 2008, IBR approved for §§ 1065.20(a) and 1065.1005.

(2) NIST Technical Note 1297, 1994 Edition, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, IBR approved for § 1065.1001.

(g) *SAE International material*. The following standards are available from SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001, (724) 776-4841, or <http://www.sae.org>:

(1) SAE 770141, 1977, Optimization of Flame Ionization Detector for Determination of Hydrocarbon in Diluted Automotive Exhausts, Glenn D. Reschke, IBR approved for § 1065.360(c).

(2) SAE J1151, Methane Measurement Using Gas Chromatography, stabilized September 2011, IBR approved for §§ 1065.267(b) and 1065.750(a).

[79 FR 23818, Apr. 28, 2014, as amended at 81 FR 74193, Oct. 25, 2016; 85 FR 78468, Dec. 4, 2020]

EFFECTIVE DATE NOTE: At 86 FR 34579, June 29, 2021, § 1065.1010 was amended, effective July 29, 2021.

**Subpart L—Methods for Unregulated and Special Pollutants**

SOURCE: 79 FR 23820, Apr. 28, 2014, unless otherwise noted.

**§ 1065.1101 Applicability.**

This subpart specifies procedures that may be used to measure emission constituents that are not measured (or not separately measured) by the test procedures in the other subparts of this part. These procedures are included to facilitate consistent measurement of unregulated pollutants for purposes other than compliance with emission standards. Unless otherwise specified in the standard-setting part, use of these procedures is optional and does not replace any requirements in the rest of this part.

**SEMI-VOLATILE ORGANIC COMPOUNDS****§ 1065.1103 General provisions for SVOC measurement.**

The provisions of §§ 1065.1103 through 1065.1111 specify procedures for measuring semi-volatile organic compounds (SVOC) along with PM. These sections specify how to collect a sample of the SVOCs during exhaust emission testing, as well as how to use wet chemistry techniques to extract SVOCs from the sample media for analysis. Note that the precise method you use will depend on the category of SVOCs being measured. For example, the method used to measure polynuclear aromatic hydrocarbons (PAHs) will differ slightly from the method used to measure dioxins. Follow standard analytic

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*mail to Commanding Officer (MSC), Attn: Marine Safety Center, U.S. Coast Guard Stop 7430, 2703 Martin Luther King Jr. Avenue SE., Washington, DC 20593-7430.*

*Maximum allowable gas-freeing rate* means the maximum volumetric rate at which a barge may be gas-freed during cleaning operations.

*Maximum allowable stripping rate* means the maximum volumetric rate at which a barge may be stripped during cleaning operations prior to the opening of any hatch and/or fitting on the cargo tank being stripped.

*Maximum allowable transfer rate* means the maximum volumetric rate at which a vessel may receive cargo or ballast.

*Minimum oxygen concentration for combustion (MOCC)* means the lowest level of oxygen in a vapor or vapor mixture that will support combustion.

*New vapor collection system* means a vapor collection system that is not an existing vapor collection system.

*Service vessel* means a vessel that transports bulk liquid cargo between a facility and another vessel.

*Set pressure* means the pressure at which the pressure or vacuum valve begins to open and the flow starts through the valve.

*Stripping* means the removal, to the maximum extent practicable, of cargo residue remaining in the barge's cargo tanks and associated fixed piping system after cargo transfer or during cleaning operations.

*Vacuum displacement system* means a system that removes vapors from a barge's cargo tanks during gas-freeing by sweeping air through the cargo tank hatch openings.

*Vapor balancing* means the transfer of vapor displaced by incoming cargo from the tank of a vessel or facility receiving cargo into a tank of the vessel or facility delivering cargo via a vapor collection system.

*Vapor collection system* means an arrangement of piping and hoses used to collect vapor emitted to or from a vessel's cargo tanks and to transport the vapor to a vapor processing unit or a tank.

*Vapor control system (VCS)* means an arrangement of piping and equipment used to control vapor emissions col-

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lected to or from a vessel. It includes the vapor collection system and vapor processing unit or a tank.

*Vapor processing unit* means the components of a VCS that recover, destroy, or disperse vapor collected from a vessel.

*Vessel-to-vessel transfer (direct or through a shore loop)* means either—

(1) The transfer of a bulk liquid cargo from a tank vessel to a service vessel; or

(2) The transfer of a bulk liquid cargo from a service vessel to another vessel in order to load the receiving vessel to a deeper draft.

*Vessel vapor connection* means the point in a vessel's fixed vapor collection system where the system connects with the vapor collection hose or arm.

[USCG-1999-5150, 78 FR 42642, July 16, 2013, as amended by USCG-2013-0671, 78 FR 60147, Sept. 30, 2013; USCG-2016-0498, 82 FR 35089, July 28, 2017]

**§ 39.1005 Incorporation by reference—TB/ALL.**

(a) Certain material is incorporated by reference (IBR) into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the Coast Guard must publish notice of change in the FEDERAL REGISTER and the material must be available to the public. All approved material is available for inspection at the Coast Guard Headquarters, Commandant (CG-ENG), Attn: Office of Design and Engineering Standards, U.S. Coast Guard Stop 7509, 2703 Martin Luther King Jr. Avenue SE, Washington, DC 20593-7509, telephone 202-372-1418 and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). Also, it is available from the sources indicated in this section.

(b) American National Standards Institute (ANSI), 25 West 43rd Street, 4th floor, New York, NY 10036.

**Coast Guard, DHS****§ 39.1009**

(1) ANSI B16.5, Steel Pipe Flanges and Flanged Fittings, 1981, IBR approved for §§ 39.2001(i) and 39.6001(k).

(2) [Reserved]

(c) American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005.

(1) API Standard 2000, Venting Atmospheric and Low-Pressure Storage Tanks (Non-refrigerated and Refrigerated), Third Edition, January 1982 (reaffirmed December 1987) ("API 2000"), IBR approved for § 39.2011(b).

(2) [Reserved]

(d) ASTM International (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

(1) ASTM F1122-87 (Reapproved 1992)—Standard Specification for Quick Disconnect Couplings ("ASTM F1122"), IBR approved for § 39.2001(k).

(2) ASTM F1271—Standard Specification for Spill Valves for Use in Marine Tank Liquid Overpressure Protection Applications ("ASTM F1271"), December 29, 1989, IBR approved for § 39.2009(a).

(e) International Electrotechnical Commission (IEC), Bureau Central de la Commission Electrotechnique Internationale, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

(1) IEC 60309-1 Plugs, Socket-Outlets and Couplers for Industrial Purposes—Part 1: General Requirements, Edition 4.2 2012-06, IBR approved for § 39.2009(a).

(2) IEC 60309-2 Plugs, Socket-Outlets and Couplers for Industrial Purposes—Part 2: Dimensional Interchangeability Requirements for Pin and Contact-tube Accessories, Edition 4.2 2012-05, IBR approved for § 39.2009(a).

(f) International Maritime Organization (IMO), 4 Albert Embankment, London SE1 7SR, United Kingdom.

(1) International Convention for the Safety of Life at Sea, Consolidated Text of the 1974 SOLAS Convention, the 1978 SOLAS Protocol, the 1981 and 1983 SOLAS Amendments (1986) ("SOLAS"), IBR approved for § 39.2001(e).

(2) [Reserved]

(g) National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Suite 1752, Rosslyn, VA 22209.

(1) ANSI NEMA WD-6—Wiring Devices, Dimensional Requirements, 1988 ("NEMA WD-6"), IBR approved for § 39.2009(a)

(2) [Reserved]

(h) National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471.

(1) NFPA 70—National Electrical Code, 2011, IBR approved for § 39.2009(a).

(2) [Reserved]

(i) Oil Companies International Marine Forum (OCIMF), 29 Queen Anne's Gate, London SW1H 9BU, England.

(1) International Safety Guide for Oil Tankers and Terminals, Fifth Edition, 2006 ("ISGOTT"), IBR approved for §§ 39.3001(g), 39.5001(c), 39.6001(g), and 39.6005(a).

(2) [Reserved]

[USCG-1999-5150, 78 FR 42642, July 16, 2013, as amended by USCG-2020-0304, 85 FR 58282, Sept. 18, 2020]

**§ 39.1009 Additional tank vessel vapor processing unit requirements—TB/ALL**

(a) Vapor piping, fitting, valves, flanges, and pressure vessels comprising the construction and installation of a permanent or portable vapor processing unit onboard a tank vessel must meet the marine engineering requirements of 46 CFR chapter I, subchapter F.

(b) Electrical equipment comprising the construction and installation of a permanent or portable vapor processing unit onboard a tank vessel must meet the electrical engineering requirements of 46 CFR chapter I, subchapter J.

(c) In addition to complying with the rules of this part, tank vessels with a permanent or portable vapor processing unit must comply with applicable requirements of 33 CFR part 154, subpart P.

(d) When differences between the requirements for vessels contained in 46 CFR chapter I, subchapters F and J and requirements for facilities contained in 33 CFR part 154, subpart P need to be resolved, the requirements of 46 CFR chapter I, subchapters F and J apply, unless specifically authorized by the Marine Safety Center.

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(f) If a rupture disk is installed on a cargo tank fitted with a vapor collection system, it must meet the requirements of 46 CFR 39.2009(a)(4).

[USCG-1999-5150, 78 FR 42642, July 16, 2013, as amended by USCG-2016-0498, 82 FR 35089, July 28, 2017]

**§ 39.2009 Tank barge liquid overfill protection—B/ALL.**

(a) Each cargo tank of a tank barge must have one of the following liquid overfill protection arrangements:

(1) A system meeting the requirements of 46 CFR 39.2007 that—

(i) Includes a self-contained power supply;

(ii) Is powered by generators on the barge; or

(iii) Receives power from a facility and is fitted with a shore tie cable and a 120-volt, 20-ampere explosion-proof plug that meets—

(A) ANSI NEMA WD-6 (incorporated by reference, see 46 CFR 39.1005);

(B) NFPA 70, Articles 406.9 and 501-145 (incorporated by reference, see 46 CFR 39.1005); and

(C) 46 CFR 111.105-9;

(2) An intrinsically safe overfill control system that—

(i) Is independent of the cargo-gauging device required by 46 CFR 39.2003(a);

(ii) Activates an alarm and automatic shutdown system at the facility overfill control panel 60 seconds before the tank is 100 percent liquid-full during a facility-to-vessel cargo transfer;

(iii) Activates an alarm and automatic shutdown system on the vessel discharging cargo 60 seconds before the tank is 100 percent liquid-full during a vessel-to-vessel cargo transfer;

(iv) Can be inspected at the tank for proper operation prior to each loading;

(v) Consists of components that, individually or in series, will not generate or store a total of more than 1.2 volts (V), 0.1 amperes (A), 25 megawatts (MW), or 20 microJoules ( $\mu$ J);

(vi) Has at least one tank overfill sensor switch per cargo tank that is designed to activate an alarm when its normally closed contacts are open;

(vii) Has all tank overfill sensor switches connected in series;

(viii) Has interconnecting cabling that meets 46 CFR 111.105-11(b) and (d), and 46 CFR 111.105-17(a); and

(ix) Has a male plug with a five-wire, 16-A connector body meeting IEC 60309-1 and IEC 60309-2 (both incorporated by reference, see 46 CFR 39.1005), that is—

(A) Configured with pins S2 and R1 for the tank overfill sensor circuit, pin G connected to the cabling shield, and pins N and T3 reserved for an optional high-level alarm circuit meeting the requirements of this paragraph; and

(B) Labeled “Connector for Barge Overflow Control System” and labeled with the total inductance and capacitance of the connected switches and cabling;

(3) A spill valve that meets ASTM F1271 requirements (incorporated by reference, see 46 CFR 39.1005), and—

(i) Relieves at a predetermined pressure higher than the pressure at which the pressure relief valves meeting the requirements of 46 CFR 39.2011 operate;

(ii) Limits the maximum pressure at the top of the cargo tank during liquid overfill to not more than the maximum design working pressure for the tank when at the maximum loading rate for the tank; and

(iii) Has a means to prevent opening due to cargo sloshing while the vessel is in ocean or coastwise service; or

(4) A rupture disk arrangement that meets paragraphs (a)(3)(i), (ii), and (iii) of this section and is approved by the Commandant.

(b) A tank barge authorized to carry a cargo having toxic properties, meaning they are listed in 46 CFR Table 151.05 with the “Special requirements” column referring to 46 CFR 151.50-5, must comply with the requirements of 46 CFR 39.2001(m).

**§ 39.2011 Vapor overpressure and vacuum protection—TB/ALL.**

(a) The cargo tank venting system required by 46 CFR 32.55 must—

(1) Be capable of discharging cargo vapor at the maximum transfer rate plus the vapor growth for the cargo such that the pressure in the vapor space of each tank connected to the vapor control system (VCS) does not exceed—

**§ 56.60-2**

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGFR 72-59R, 37 FR 6190, Mar. 25, 1972; CGD 72-206R, 38 FR 17229, June 29, 1973; CGD 73-248, 39 FR 30839, Aug. 26, 1974; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CGD 77-140, 54 FR 40611, Oct. 2, 1989; 55 FR 39988, 39969, Oct. 1, 1990; CGD 95-027, 61 FR 26001, May 23, 1996]

**§ 56.60-2 Limitations on materials.**

*Welded pipe and tubing.* The following restrictions apply to the use of welded pipe and tubing specifications when utilized in piping systems, and not when utilized in heat exchanger, boiler, pressure vessel, or similar components:

(a) *Longitudinal joint.* Wherever possible, the longitudinal joint of a welded pipe shall not be pierced with holes for branch connections or other purposes.

(b) *Class II.* Use unlimited except as restricted by maximum temperature or pressure specified in Table 56.60-1(a) or by the requirements contained in § 56.10-5(b) of this chapter.

(c) *Class I.* (1) For those specifications in which a filler metal is used, the following applies to the material as furnished prior to any fabrication:

(i) For use in service above 800 °F. full welding procedure qualifications by the Coast Guard are required. See part 57 of this subchapter.

(ii) Ultrasonic examination as required by item S-6 in ASTM A-376 shall be certified as having been met in all applications except where 100 percent radiography is a requirement of the particular material specification.

(2) For those specifications in which no filler material is used in the welding process, the ultrasonic examination as required by item S-6 in ASTM A-376 shall be certified as having been met for service above 800 °F.

**TABLE 56.60-2(a)—ADOPTED SPECIFICATIONS NOT LISTED IN THE ASME CODE**

| ASTM specifications   | Source of allowable stress   | Notes |
|---|------------------------------|-------|
| FERROUS MATERIALS <sup>1</sup>  |                              |       |
| Bar stock:  |                              |       |
| A276 (Grades 304-A, 304L-A, 310-A, 316-A, 316L-A, 321-A, 347-A, and 348-A). | See footnote 4. .... (4).    |       |
| A575 and A576 (Grades 1010-1030)  | See footnote 2. .... (2, 2). |       |

**46 CFR Ch. I (10-1-97 Edition)****TABLE 56.60-2(a)—ADOPTED SPECIFICATIONS NOT LISTED IN THE ASME CODE—Continued**

| ASTM specifications               | Source of allowable stress     | Notes        |
|-----------------------------------|--------------------------------|--------------|
| NONFERROUS MATERIALS              |                                |              |
| Bar stock:                        |                                |              |
| B16 (soft and half hard tempers). | See footnote 5. .... (5, 7).   |              |
| B21 (alloys A, B, and C).         | See footnote 8. .... (8).      |              |
| B124:                             |                                |              |
| Alloy 377                         | See footnotes 5 and 9.         | (5, 9).      |
| Alloy 464                         | See footnote 8. .... (8, 10).  |              |
| Alloy 655                         | See footnote 11. .... (11).    |              |
| Alloy 642                         | See footnote 12. .... (7, 12). |              |
| Alloy 630                         | See footnote 13. .... (7, 13). |              |
| Alloy 485                         | See footnote 8. .... (8, 10).  |              |
| Forgings:                         |                                |              |
| B263 (forging brass)              | See footnotes 5 and 9.         | (5, 9).      |
| Castings:                         |                                |              |
| B26                               | See footnotes 5, 14, and 15.   | (5, 14, 15). |
| B85                               | See footnotes 5, 14, and 15.   | (5, 14, 15). |

<sup>1</sup> For limitations in use refer to § 56.60-5.

<sup>2</sup> Allowable stresses shall be the same as those listed in UCS23 of section VIII of the ASME Code for SA-675 material of equivalent tensile strength.

<sup>3</sup> Physical testing shall be performed as for material manufactured to ASME Specification SA-675, except that the bend test shall not be required.

<sup>4</sup> Allowable stresses shall be the same as those listed in UCS23 of section VIII of the ASME Code for the corresponding SA-182 material.

<sup>5</sup> Limited to air and hydraulic service with a maximum design temperature of 150 °F. The material must not be used for salt water service or other fluids that may cause dezincification or stress corrosion cracking.

<sup>6</sup> [Reserved]

<sup>7</sup> An ammonia vapor test, in accordance with ASTM B 858M-95, shall be performed on a representative model of each finished product design.

<sup>8</sup> Allowable stresses shall be the same as those listed in UCS23 of section VIII of the ASME Code for SB-171, naval brass.

<sup>9</sup> An ammonia vapor test, in accordance with ASTM B 858-95, shall be performed on a representative model for each finished product design. Tension tests shall be performed to determine tensile strength, yield strength, and elongation. Minimum values shall be those listed in table 3 of ASTM B283.

<sup>10</sup> Physical testing, including mercurous nitrate test, shall be performed as for material manufactured to ASTM B21.

<sup>11</sup> Physical testing shall be performed as for material manufactured to ASTM B96. Allowable stresses shall be the same as those listed in UNF23 of section VIII of the ASME Code for SB-96 and shall be limited to a maximum allowable temperature of 212 °F.

<sup>12</sup> Physical testing shall be performed as for material manufactured to ASTM B171, alloy D. Allowable stresses shall be the same as those listed in UNF23 of section VIII of the ASME Code for SB-171, aluminum bronze D.

<sup>13</sup> Physical testing shall be performed as for material manufactured to ASTM B171, alloy E. Allowable stresses shall be the same as those listed in UNF23 of section VIII of the ASME Code for SB-171, aluminum bronze, alloy E.

<sup>14</sup> Tension tests shall be performed to determine tensile strength, yield strength, and elongation. Minimum values shall be those listed in table X-2 of ASTM B85.

<sup>15</sup> Those alloys with a maximum copper content of 0.6 percent or less shall be acceptable under this specification. Cast aluminum shall not be welded or brazed.

Note: This Table 56.60-2(a) is a listing of adopted bar stock and nonferrous forging and casting specifications not listed in the ASME Code. Particular attention should be given to the supplementary testing requirements and service limitations contained in the footnotes.

## Coast Guard, DOT

**§ 56.60-10**

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGD 72-104R, 37 FR 14233, July 18, 1972; CGD 73-248, 39 FR 30839, Aug. 26, 1974; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CGD 77-140, 54 FR 40612, Oct. 2, 1989; CGD 95-012, 60 FR 48050, Sept. 18, 1995; CGD 95-027, 61 FR 26001, May 23, 1996; CGD 95-028, 62 FR 51201, Sept. 30, 1997]

**EFFECTIVE DATE NOTE:** By CGD 95-028, 62 FR 51201, Sept. 30, 1997, § 56.60-2 was amended by removing paragraph (a); by redesignating paragraph (b) as the introductory text to the section; by redesignating paragraphs (b)(1), (b)(2), (b)(3), (b)(3)(1), (b)(3)(1)(A), and (b)(3)(1)(B) as paragraphs (a), (b), (c), (c)(1), (c)(1)(1), and (c)(1)(ii), respectively; by redesignating paragraph (b)(3)(ii) as paragraph (c)(2) and revising the paragraph; and by revising footnotes 7 and 9 in the table, effective Oct. 30, 1997. For the convenience of the user, the superseded text is set forth as follows:

TABLE 56.60-2(A)—ADOPTED SPECIFICATIONS NOT LISTED IN THE ASME CODE ,p0,6/7

<sup>7</sup> A mercurous nitrate test, in accordance with ASTM B154, shall be performed on a representative model of each finished product design.

<sup>9</sup> A mercurous nitrate test, in accordance with ASTM B154, shall be performed on a representative model for each finished product design. Tension tests shall be performed to determine tensile strength, yield strength, and elongation. Minimum values shall be those listed in table 3 of ASTM B283.

**§ 56.60-3 Ferrous materials.**

(a) Ferrous pipe used for salt water service must be protected against corrosion by hotdip galvanizing or by the use of extra heavy schedule material.

(b) (Reproduces 123.2.3(c).) Carbon or alloy steel having a carbon content of more than 0.35 percent may not be used in welded construction or be shaped by oxygen cutting process or other thermal cutting process.

[CGD 73-254, 40 FR 40165, Sept. 2, 1975]

**§ 56.60-5 Steel (High temperature applications).**

(a) (Reproduces 123.2.3(a).) Upon prolonged exposure to temperatures above 775 °F., the carbide phase of plain carbon steel, plain nickel alloy steel, carbon-manganese alloy steel, manganese-vanadium alloy steel, and carbon-silicon steel may be converted to graphite.

(b) (Reproduces 123.2.3(b).) Upon prolonged exposure to temperatures above

**§ 56.60-2 Limitations on materials.**

(a) **Stresses.** The maximum stress in the materials listed in Table 56.60-1(a) must be 80 percent of the value contained in the designated source of allowable stress values, unless the dynamic effect is accounted for in the design in accordance with the requirement contained in § 56.07-10(c) of this chapter. Further limitations on allowable stress values are contained in § 56.07-10 (c) and (e). Italicized values of stress in referenced specifications shall not be used.

\* \* \* \*

(c) \* \* \*  
(2) For those specifications in which no filler metal is used in the welding process, the following applies:

(A) Ultrasonic examination as required by item S-6 in ASTM A-376 shall be certified as having been met for service above 800 °F.

\* \* \* \*

875 °F., the carbide phase of alloy steels, such as carbon-molybdenum, manganese-molybdenum-vanadium, manganese-chromium-vanadium and chromium-vanadium, may be converted to graphite.

(c) [Reserved]

(d) The design temperature of a piping system employing one or more of the materials listed in paragraphs (a), (b), and (c) of this section shall not exceed the lowest graphitization temperature specified for materials used.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGD 72-104R, 37 FR 14233, July 18, 1972; CGD 73-248, 39 FR 30839, Aug. 26, 1974; CGD 73-254, 40 FR 40165, Sept. 2, 1975]

**§ 56.60-10 Cast iron and malleable iron.**

(a) The low ductility of cast iron and malleable iron should be recognized and the use of these metals where shock loading may occur should be

**CERTIFICATE OF SERVICE**

I certify that on September 23, 2022, a true and correct copy of this Appellants' Brief was filed via the Court's electronic filing system, which will forward a copy to all counsel of record. I certify that all participants in this case are registered CM/ECF users.

Dated: September 23, 2022

/s/ Donald B. Verrilli Jr.

Donald B. Verrilli Jr.